4D118

Department of Energy

ROCKY FLATS FIELD OFFICE
P.O. BOX 928
GOLDEN, COLORADO 80402-0928

NOV 21 1994

000048625

94-DOE-11938

BEST AVAILABLE COPY

Mr. Joe Schieffelin, Unit Leader
Hazardous Waste Control Program
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, Colorado 80222-1530

Mr. Martin Hestmark
U.S. Environmental Protection Agency, Region VIII
ATTN: Rocky Flats Project Manager, 8HWM-RI
999 18th Street, Suite 500, 8WM-C
Denver, CO 80202-2405

Gentlemen:

This letter constitutes the formal transmittal of the Final Industrial Area Interim Measure/Interim Remedial Action Decision Document and the Final Responsiveness Summary. On November 21, 1994, two of the above referenced documents were delivered to your office. The transmittal of this document successfully fulfills the November 23, 1994, Interagency Agreement milestone.

If you have any questions or need additional information, please call Regina Sarter at 966-7252.

Sincerely,

Steven W. Slaten
IAG Coordinator
Environmental Restoration

ADMIN RECORD

A-OU08-000357

FINAL INTERIM MEASURES/ INTERIM REMEDIAL ACTION DECISION DOCUMENT FOR THE ROCKY FLATS INDUSTRIAL AREA

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

November 1994

ENVIRONMENTAL RESTORATION PROGRAM

EXECUTIVE SUMMARY

The Interim Measure/Interim Remedial Action/Decision Document (IM/IRA/DD) for the Industrial Area at Rocky Flats Plant (RFP) was prepared in accordance with the RFP Interagency Agreement (IAG), dated January 22, 1991, and applicable regulatory guidance documents. U.S. Environmental Protection Agency (EPA) and Colorado Department of Health (CDH) comments that were provided throughout its development have been incorporated into this IM/IRA/DD. The U.S. Department of Energy's (DOE's) Environmental Restoration Division at Rocky Flats will be responsible for the implementation of the proposed actions detailed in this decision document. An annual Industrial Area IM/IRA program status report will be developed by DOE, followed by a technical meeting with CDH and EPA to discuss program performance and future monitoring activities. This IM/IRA/DD is based on information collected, compiled, and reviewed from October 1993 through February 1994.

The change in the RFP mission from nuclear weapons production to environmental restoration has provided an opportunity to reevaluate several monitoring programs currently in place at RFP and begin the process of their evolution to address future requirements relative to the new mission. This proactive approach is intended to facilitate current and future environmental monitoring programs for all media at RFP. These monitoring programs, in conjunction with emergency response procedures, work control procedures, potential release mitigation procedures, and employee awareness, will provide a comprehensive interim protection system for the Industrial Area. This system is designed to protect the public and the environment throughout transition and decontamination and decommissioning (D&D) activities.

At RFP, D&D is generally defined as post-transition/deactivation activities in surplus production buildings. D&D is primarily concerned with decontamination, dismantling, removal, or entombment of surplus nuclear facilities. The primary tasks associated with

D&D are (1) surveillance and maintenance, (2) assessment and characterization, (3) environmental review, and (4) close out. Activities associated with these tasks involve the removal of equipment, piping, tanks, ducts, ceilings, and other internal building structures. In general, it is planned that D&D will be done in phases, allowing alternative interim use of most buildings before the final decommissioning of the buildings.

The objective of this Industrial Area IM/IRA/DD is to ensure that environmental monitoring is adequate to support D&D and other nonroutine activities within the Industrial Area at RFP. To achieve this objective, a monitoring safety net approach is used around the Rocky Flats Industrial Area to monitor for, protect against, and respond to any actual or potential contaminant releases. Because of the proactive nature of this Industrial Area IM/IRA program, the Industrial Area safety net approach represents a change in the objectives for the environmental monitoring programs at RFP. This objective change involves shifting the point of concern from the property line or buffer zone to the Industrial Area fenceline.

The IM/IRA/DD also provides a management approach to enhance the existing water management programs for waters collected and contained in building foundation drains, vaults, basements, and sumps. Overall management of these waters includes (1) defining sources, (2) defining drainage pathways, (3) characterization of water quality and flow, and (4) onsite treatment capabilities and practices.

The following elements are detailed in this IM/IRA/DD:

- A methodology that references existing chemical tracking databases is presented to determine constituents of potential concern and compounds of interest for current and future environmental monitoring.

- A conceptual approach that reduces large lists of potential constituents of concern to a smaller listing is provided. This reduced list results in a smaller analyte list that is more cost effective for environmental monitoring purposes.

- Potential groundwater migration pathways in the Industrial Area were assessed by creating potentiometric maps for the 1992 spring and winter seasons. The effect of building foundations drains on alluvial groundwater flow was assessed.

- Groundwater monitoring well locations are proposed based on potential source area locations, potential groundwater migration pathways, and newly acquired monitoring data results for the Industrial Area.

- Surface water monitoring in areas of concern, which previously focused on the terminal ponds (in the buffer zone), will be expanded to include the Industrial Area.

- Surface water quality and hydraulic flow conditions will be studied in the Industrial Area to establish baseline conditions.

- Foundation drains, vaults, and sumps monitoring and characterization will be expanded by increasing the number of chemical analytes, locations, and monitoring frequency, and by better defining hydraulic flow conditions. The characterization data are critical to the design of future onsite treatment upgrades and to the disposition of foundation drain, vault, and sump waters potentially containing diverse ranges of contaminants.

- Incidental and foundation drain water management practices will use three disposition approaches: (1) direct discharge to the storm water system, (2) discharge to the sanitary sewer system and (3) onsite containment and treatment.

Disposition approaches are dependent on water flow and water quality characteristics.

- Volatile organic compounds will be added to the list of chemical analytes routinely analyzed within the Industrial Area for the air monitoring program.

- Monitoring systems for air and surface water use state-of-the-art technologies to accomplish plant transition monitoring objectives. Technical improvements for monitoring building D&D activities will be reviewed regularly in an attempt to improve air and surface water monitoring capabilities.

- A link is established between the D&D monitoring activities (site monitoring and verification monitoring) and the RFP Emergency Response Program.

- Verification monitoring for D&D activities is the second and outer layer of environmental surveillance that will verify that D&D contaminant pathway protection procedures and site-specific monitoring activities are effective.

- The type and extent of verification monitoring will depend on the type of D&D activity being performed and the assessed environmental hazard associated with that activity.

- All environmental monitoring during D&D and other nonroutine activities will be performed in accordance to established Rocky Flats standard operating procedures.

- An administrative linkage that promotes communication and coordination between D&D and Industrial Area IM/IRA programs is established for the Industrial Area.

- A statistically based methodology has been identified to develop site-specific baseline conditions for environmental media at D&D activity locations and to determine when pre-programmed response actions are needed.

- A plan to construct spill control tankage for the wastewater treatment system that will enable the treatment system to manage chemical spills or releases introduced into the sanitary sewer system is presented. The milestone for this construction activity was previously associated with the RFP Pond IM/IRA and was incorporated into the Industrial Area IM/IRA/DD per agreement between the U.S. Department of Energy (DOE) and EPA.

The current RFP environmental monitoring programs reviewed and assessed for this IM/IRA/DD are extensive, well organized, and successful in meeting past environmental monitoring objectives. Additional data needs noted in this decision document are not an indication of programmatic deficiencies but reflect potential future needs relative to anticipated future monitoring objectives. These objectives include providing a comprehensive protection plan by integrating existing environmental monitoring programs within the Industrial Area.

This Industrial Area IM/IRA/DD uses the historical terminology Rocky Flats Plant (RFP) instead of Rocky Flats Environmental Technology Site (RFETS) and Colorado Department of Health (CDH) instead of Colorado Department of Public Health and the Environment (CDPHE). Draft and draft final versions of the document were released prior to the name changes for these institutions. For consistency, the new names were not used in this decision document.

(intentionally blank)

TABLE OF CONTENTS

TABLE OF CONTENTS

SECTION | **PAGE**

TABLE OF CONTENTS

SECTION **PAGE**

TABLE OF CONTENTS

SECTION **PAGE**

TABLE OF CONTENTS

SECTION **PAGE**

TABLE OF CONTENTS

SECTION PAGE

TABLE OF CONTENTS

TABLE OF CONTENTS

SECTION PAGE

TABLE OF CONTENTS

SECTION PAGE

LIST OF FIGURES

TABLE OF CONTENTS

PAGE

TABLE OF CONTENTS

PAGE

TABLE OF CONTENTS

PAGE

LIST OF TABLES

TABLE OF CONTENTS

PAGE

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF APPENDICES

Appendices are located at the end of each associated section.

TABLE OF CONTENTS

TABLE OF CONTENTS

(intentionally blank)

LIST OF ACRONYMS AND ABBREVIATIONS

ABP	Activity Based Planning
ACE	Activity Control Envelopes
AEC	U.S. Atomic Energy Commission
AIP	Agreement in Principle
Am	americium
APENs	Air Pollution Emission Notices
AQD	Air Quality Division
AQMP	Air Quality Management Plan
ARAC	atmospheric release advisory capability
ARARs	Applicable or Relevant and Appropriate Requirements
ASI	Advanced Sciences, Inc.
bgs	below ground surface
BMP	Best Management Practice
BTOC	below top of casing
C_2H_3Cl	vinyl chloride
CAA	Clean Air Act
CAM	Continuous Air Monitor
CCl_4	carbon tetrachloride
CDH	Colorado Department of Health
CDIW	Control and Disposition of Incidental Waters
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHWR	Colorado Hazardous Waste Regulations
Ci	curies
Cl	chlorine
CLP	Contract Laboratory Program
cm/sec	centimeters per second
CMP	corrugated metal pipe
CMS	Corrective Measures Study

LIST OF ACRONYMS AND ABBREVIATIONS

CNNMF	Consolidated Non-Nuclear Manufacturing Facility
COI	compounds of interest
ComRad	Community Radiation Monitoring Program
COPC	constituents of potential concern
CPFM	Colloid Polishing Filter Method
cpm	counts per minute
Cr	chromium
CTCS	Chemical Tracking and Control System
CWA	Clean Water Act
D&D	Decontamination and Decommissioning
DAC	derived air concentration
DCG	derived concentration guide
DD	Decision Document
DGO	data gathering objectives
DIV	diversion
DNAPL	dense nonaqueous-phase liquid
DOE	U.S. Department of Energy
DRCOG	Denver Regional Council of Governments
EA	Environmental Assessment
EAF	Emergency Assessment Facility
EDE	effective dose equivalent
EG&G	EG&G Rocky Flats, Inc.
EIS	Environmental Impact Statement
EM	Environmental Management
EMAD	Environmental Monitoring and Analysis Division
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act

LIST OF ACRONYMS AND ABBREVIATIONS

EPLAN	RFP Emergency Plan
EPM	Environmental Protection Management
EPMP	Environmental Protection Management Plan
EPOS	Emergency Preparedness Offsite Systems
ER	Environmental Restoration
ERD	Environmental Restoration Division
ERDA	Energy Research and Development Administration
ERM	Environmental Restoration Management
ERTSD	Environmental Restoration Technical Support Document
FDM	Fugitive Dust Model
FFCA	Federal Facility Compliance Agreement
FID	flame ionization detector
FRERP	Federal Radiological Emergency Response Plan
FRMAP	Federal Radiological Monitoring and Assessment Plan
FS	feasibility study
ft/ft	feet per foot
ft/day	feet per day
FTIR	Fourier-transform infrared system
FY	fiscal year
GAC	granular activated carbon
gpm	gallons per minute
GPMP	Groundwater Protection and Monitoring Program
GS	gaging station
HEAST	Health Effects Assessment Summary Tables
HEPA	high efficiency particulate air
HF	hyperfiltration
HNu	brand name of a portable photoionization detector
HRR	Historical Release Report

LIST OF ACRONYMS AND ABBREVIATIONS

IAG	Interagency Agreement
IHSS	Individual Hazardous Substance Site
IM	Interim Measures
IM/IRA/DD	Interim Measure/Interim Remedial Action/Decision Document
INPUFF	Integrated PUFF
IRA	Interim Remedial Action
IRIS	Integrated Risk Information System
ISC	Industrial Source Complex
ITS	interceptor trench system
IWCP	integrated work control program
Jacobs	Jacobs Engineering Group Inc.
Jeffco	Jefferson County
km	kilometer
LANL	Los Alamos National Laboratory
LDR	Land Disposal Restrictions
LEL	lower explosive limit
LHU	Lower Hydrostratigraphic Unit
MCL	Maximum Contaminant Level
MEMS	multiple-effect multiple-stage
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
MINIRAM	Miniature Real-Time Aerosol Monitor
MOA	Memorandum of Agreement
MOC	materials of concern
mph	miles per hour
mrem/yr	millirem per year
MSDS	Material Safety Data Sheet
msl	mean sea level

LIST OF ACRONYMS AND ABBREVIATIONS

NAAQS	National Ambient Air Quality Standards
ND	Nuclear Data
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NOV	Notices of Violations
NOx	oxides of nitrogen
NIST	National Institute of Standards and Technology
NPDES	National Pollutant Discharge Elimination System
NVSS	nonvolatile suspended solids
OPWL	original process waste lines
OU	operable unit
OVA	organic vapor analyzer
O_3	ozone
PAS	Particle Analysis System
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
pCi/g	picocuries per gram
pCi/L	picocuries per liter
PEIS	Programmatic Environmental Impact Statement
PID	photoionization detector
PM-10	particulate matter less than 10 micrometers in diameter
ppb	parts per billion
PPCD	Plan for the Prevention of Contaminant Dispersion
ppm	parts per million
PSA	permitted storage area
PST	permitted storage tank
PTA	permitted treatment area
Pu	plutonium

LIST OF ACRONYMS AND ABBREVIATIONS

PVC	polyvinyl chloride
QA	quality assurance
QAPD	Quality Assurance Program Description
QAPP	quality assurance project plan
R&D	research and development
RAAMP	Radiological Ambient Air Monitoring Program
RCRA	Resource Conservation and Recovery Act
REAP	Real-Time Environmental Applications Product
RFC	reference concentration
RFEDS	Rocky Flats Environmental Database System
RFFO	Rocky Flats Field Office
RFI	RCRA facility investigation
RFO	Rocky Flats Office
RFP	Rocky Flats Plant
RI	remedial investigation
Rockwell	Rockwell International
ROD	Record of Decision
SAAM	Selective Alpha Air Monitor
SAIC	Science Applications International Corporation
SAR	Safety Analysis Review
SARA	Superfund Amendments and Reauthorization Act
SCA	satellite collection area
SEA	systems engineering analysis
SEP	solar evaporation pond
SID	South Interceptor Ditch
SNM	special nuclear material
SOP	Standard Operating Procedure
SO_2	sulfur dioxide

LIST OF ACRONYMS AND ABBREVIATIONS

SVOC	semivolatile organic compound
SWMP	Surface Water Management Plan
TAL	Target Analyte List
TCE	trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TDS	total dissolved solids
TLLA	total long-lived alpha
TLLB	total long-lived beta
TMST	temporary modular storage tank
TRAC	Terrain-Responsive Atmospheric Code
TRC	total residual chlorine
TSCA	Toxic Substance Control Act
TSIP	Transition Standards Identification Program
TSP	total suspended particulates
TSS	total suspended solids
UBC	under-building contamination
UCNI	Unclassified Controlled Nuclear Information
UHSU	Upper Hydrostratigraphic Unit
UMTRA	Uranium Mill Tailings Remedial Action
USGS	U.S. Geological Survey
USQ	Unreviewed Safety Question Determinations
UV	ultraviolet
VAX*	Virtual Address Extension
VC	vapor compression
VOA	volatile organic analytes
VOC	volatile organic compound
VSS	vital safety systems

LIST OF ACRONYMS AND ABBREVIATIONS

WBS	Work Breakdown Structure
WEMS	Waste and Environmental Management System
WET	whole effluent toxicity
WSRIC	Waste Stream Residue Identification and Characterization
WWTP	waste water treatment plant
YSI	Yellow Springs Instruments
1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene
1,2-DCA	1,2-dichloroethane
1,2-DCE	1,2-dichloroethene
° C	degrees Celsius
° F	degrees Fahrenheit
μg/L	micrograms per liter
μg/mL	micrograms per milliliter
$\mu g/m^3$	micrograms per cubic meter
μm	micrometer
μmhos/cm	micromhos per centimeter

Section 1.0

1.0 INTRODUCTION

This document is the Interim Measure/Interim Remedial Action/Decision Document (IM/IRA/DD) for the Rocky Flats Plant (RFP) Industrial Area and was prepared in accordance with the Rocky Flats Interagency Agreement (IAG), dated January 22, 1991, and applicable regulatory guidance documents. Comments from the U.S. Environmental Protection Agency (EPA) and Colorado Department of Health (CDH) were incorporated throughout the development of this IM/IRA/DD. Generally, this IM/IRA/DD is based on information collected, compiled, and reviewed from October 1993 through February 1994.

The U.S. Department of Energy's Environmental Restoration Division at Rocky Flats will be responsible for the implementation of the proposed actions detailed in this decision document. An annual Industrial Area IM/IRA program status report will be developed by DOE, followed by a technical meeting with CDH and EPA to discuss program performance and future monitoring activities.

The purpose of this IM/IRA/DD for the RFP Industrial Area is to ensure that environmental monitoring is sufficient to detect potential releases to the environment during decontamination and decommissioning (D&D) or other nonroutine activities. This program is intended to facilitate the environmental programs at Rocky Flats based on the U.S. Department of Energy's (DOE's) new mission. In addition, this document provides a plan to enhance the existing water management programs for waters collected and contained in building footing drains, basements, valve vaults, and sumps. Proposed actions specified in the IM/IRA/DD will facilitate activities within the Industrial Area that will increase the capability of detecting and preventing contaminant releases before they migrate beyond the Industrial Area boundary.

The IM/IRA process is used at Rocky Flats as a means to rapidly complete remedial actions by reducing or eliminating a potential threat to human health and the environment. The term IM/IRA is a combination of the terminology used for environmental investigation and cleanup programs: the Resource Conservation and Recovery Act (RCRA) IM and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) IRA. CERCLA is designed as a response program to deal with contamination created by previous waste management practices. RCRA is a regulatory program for current and new sites to prevent industrial sites from becoming contaminated (Arbuckle et al. 1989).

The main features that differentiate an interim action from a CERCLA Remedial Investigation/Feasibility Study (RI/FS) or a RCRA Facility Investigation/Corrective Measures Study (RFI/CMS) are (1) a limited number of alternatives are evaluated, (2) a complete baseline risk assessment is not required, and (3) documentation requirements are minimized.

The IM/IRA concept is used at Rocky Flats to reduce potential risks at a site by instituting temporary measures to stabilize the site or to prevent further or potential contamination from leaving the site. The IM/IRA/DD must be followed by, and be compatible with, a Record of Decision (ROD) that will (1) provide long-term protection of human health and the environment, (2) fully address the principal threats posed by the site, and (3) address the statutory preference for treatment that reduces toxicity, mobility, or volume of wastes (EPA 1991).

The proposed actions selected in this IM/IRA/DD are protective of human health and the environment. Because this IM/IRA/DD does not constitute the final remedy for the Industrial Area, the statutory preference for remedies that use the above-mentioned treatment options will be addressed by the final response action. Because this is an

IM/IRA/DD, the review of monitoring programs and the management and treatment of foundation drain, vaults, and sump waters will be ongoing.

The entire RFP consists of approximately 6,550 acres of federally owned land in northern Jefferson County. The plant is located along with the 341-acre National Wind Energy Test Center on a federal natural preserve. The heavily secured area known as the Industrial Area consists of a 384-acre complex surrounded by a 6,150-acre buffer zone. The Industrial Area encompasses 248 manufacturing, chemical processing, laboratory and support facilities. The facilities for fabrication and recovery of plutonium comprise the majority of the buildings (EG&G 1993).

1.1 MISSION OF THE ROCKY FLATS PLANT

The mission of RFP has changed in recent years to the following activities: (1) performing environmental restoration and waste management activities and (2) developing plans for the transition of various facilities to other uses or for D&D.

On January 28, 1992, former President Bush announced that the W-88 warheads would no longer be produced for the Trident submarines. Because the production of the W-88 nuclear weapon triggers was the only remaining plutonium production assignment for RFP, the plant's mission was changed. On March 14, 1992, former Secretary of Energy James Watkins announced that the Rocky Flats mission would change from nuclear weapons production to environmental restoration (ER) and waste management. The objective behind these environmental restoration programs would be for eventual D&D of the Rocky Flats site.

At RFP, D&D is generally defined as post-transition/deactivation activities in surplus production buildings. D&D is primarily concerned with decontamination, dismantling, removal, or entombment of surplus nuclear facilities. The primary tasks associated with

D&D are (1) surveillance and maintenance, (2) assessment and characterization, (3) environmental review, and (4) close out. Activities associated with these tasks involve the removal of equipment, piping, tanks, ducts, ceilings, and other internal building structures. In general, it is planned that D&D will be done in phases, allowing alternative interim use of most buildings before the final decommissioning of the buildings.

1.2 INTERIM MEASURE/INTERIM REMEDIAL ACTION OBJECTIVES

This IM/IRA/DD presents a program that proactively addresses the current and future monitoring requirements for the Rocky Flats Industrial Area. The objective is to maintain a safety net around the Industrial Area to monitor for, protect against, and respond to potential contaminant releases until and during D&D and other nonroutine activities. This safety net involves the plant protective systems that are currently in place for the safety and protection of the public and environment. Examples of these protective systems include environmental monitoring, emergency/spill response, work control, employee awareness and training, building safety and alarm systems, D&D project safety systems, and D&D project-engineered barriers.

This safety-net objective was accomplished through a systematic review of existing documentation and databases at RFP. From this review, a conceptual model was developed for the potential migration pathways of contaminants within the Industrial Area. Potential sources of contamination and chemicals of concern were identified in the Industrial Area. Potential source areas include fixed contamination in the facility, individual hazardous substance sites (IHSSs), and potential releases from buildings that store chemicals or have waste storage areas. This document represents a plan to increase the capability of detecting potential releases at or within the boundaries of the Industrial Area during the current and future activities at RFP.

The major goals behind the development of this IM/IRA/DD are as follows:

- Identify contaminant pathways for all environmental media that could transport contaminants from the Industrial Area and evaluate monitoring capabilities at those locations. This will identify any monitoring needs based upon the safety-net objective.

- Review existing RFP databases and develop a methodology to compile a listing of chemicals to monitor (constituents of potential concern [COPCs]) for current and future monitoring activities in the Industrial Area. This activity will result in a more focused listing of chemicals in a given location so a cost-effective monitoring program can be established.

- Conceptualize and develop a future verification monitoring program that complements site-specific D&D activities within the Industrial Area. The verification monitoring program would detect potential contaminant releases before leaving the Industrial Area, promote pre-planning and coordination, and detail appropriate response actions to be undertaken by the Industrial Area IM/IRA, D&D, and emergency response representatives.

- Establish statistically based criteria for developing baseline and response action conditions for COPCs. These criteria will attempt to minimize false-positive and false-negative monitoring errors.

- Create a protective and cost-effective D&D verification monitoring program using a combination of the best available real-time monitoring technologies and sample collection instrumentation, which would interface with existing RFP remote sampling and detection systems. This is a cost-effective approach using existing state of the art monitoring programs that are already established in the Industrial Area.

- Evaluate and enhance the current incidental water and foundation drain management programs to reduce the potential risk of contaminant transport from the Industrial Area via discharge into the storm water drainages, wastewater treatment plant (WWTP), or by the onsite wastewater treatment systems within the Industrial Area. Enhancements to these water management programs will allow better monitoring and disposition practices within the Industrial Area.

- Detail the purpose and the completion schedule milestone concerning the construction of spill control containment for the WWTP. This containment will enhance the WWTP's capability to manage chemical spills or releases introduced into the sanitary sewer system. The milestone for this construction activity was previously associated with the RFP Pond IM/IRA and was incorporated into this Industrial Area IM/IRA/DD according to the agreement between DOE and EPA.

1.3 SCOPE OF WORK

The development of this IM/IRA/DD involved an intensive review of existing monitoring information specific to the Industrial Area. The reviewed information was used to develop the document's historical site characterization, a description of historical waste practices, COPCs, and media-specific contaminant pathways. Based on the chemical source and pathways information, the current monitoring network within the Industrial Area was assessed in terms of spatial distribution, depth, frequency of sampling, and monitoring for the appropriate chemical parameters.

A potential contaminant pathway that is also addressed in this IM/IRA/DD involves the monitoring and management of incidental and foundation drain waters in the Industrial Area. Incidental waters are waters that accumulate in building basements, valve vaults, and sumps, and that have the potential for containing hazardous chemicals. This IM/IRA/DD addresses the influence of the foundation drains on the groundwater pathway and discusses the overall management of incidental and foundation drain waters from monitoring to disposition.

Because this IM/IRA/DD is designed to be proactive in nature, the environmental monitoring systems at and within the boundaries of the Industrial Area were evaluated. In the past, environmental monitoring has emphasized areas beyond the Industrial Area and including the buffer zone; the RFP property fence line has been the point of concern. This buffer zone emphasis is particularly true for surface water, where monitoring has been primarily concentrated in the buffer zone and associated with the water retention ponds. The current RFP environmental monitoring programs reviewed and assessed for this report are extensive, well organized, and successful in meeting the primary environmental monitoring objectives: (1) environmental compliance and (2) protection of human health and the environment (Figure 1-1). In an effort to be proactive, DOE has taken a more global approach to the site and is addressing the Industrial Area as a single source, or a collection of smaller source areas, which allows monitoring activities to be focused closer to the potential sources of contamination. This approach does not minimize the environmental monitoring in the buffer zone but merely focuses some monitoring activities on the pathways and release mechanisms from the potential source areas.

The scope of the IM/IRA/DD for the Industrial Area includes assessing data needs in the current monitoring programs relative to the Industrial Area safety-net concept. Additional data needs refer to a monitoring area where environmental data are missing based on a defined monitoring objective. It is important to note that identified data needs in this report do not constitute a failure or a problem with the existing RFP monitoring programs. These noted data needs reflect areas that may require enhancement based on new monitoring objectives and approaches for the Industrial Area relative to the new mission for RFP.

FINAL

FIGURE 1-1
Industrial Area IM/IRA/DD
Summary of Environmental Protection Programs at Rocky Flats Industrial Area

INDUSTRIAL AREA ENVIRONMENTAL PROTECTION MANAGEMENT

CHEMICAL TRACKING
- WSRIC
- WEMS
- CTCS
- SEA
- SARA TITLE III

EMERGENCY RESPONSE
- EPCRA
- CERCLA
- DOE Orders
- FRERP
- RCRA
- TSCA
- SARA III
- FRMAP

SOIL MONITORING
- Annual Site Wide
- OU Investigation
- OU Remediation
- Offsite

ENVIRONMENTAL RESTORATION
- IM / IRA
- CERCLA / RCRA
- OU Management
- OU Investigations
- OU Remediation

GROUNDWATER MONITORING
- Background
- RCRA
- CERCLA
- Boundary
- Special Purpose

AIR MONITORING
- Ambient Radioactive
- Ambient Nonradioactive
- Effluent Emission Radioactive
- Effluent Emmission Nonradioactive
- Meteorological

WORK CONTROL
- IWCPs
- Administrative Controls
- Release Prevention
- Activity-Specific Monitoring
- Pathway Protection
- Work Plan Approval
- Operations Review Committee
- USQ
- SARs

DECONTAMINATION AND DECOMMISSIONING
- Transition
- Project Preparation
- Environmental Review
- Subproject Baseline Development
- Facility Characterization
- D&D Engineering
- Implementation Planning
- Decommissioning Operations
- Closeout and Verification
- Post-Operations Activities

SURFACE WATER MONITORING
- Waste Water Treatment Plant (NPDES)
- Storm Water (NPDES)
- Incidental Water
- Event Related
- Pond Management

CERCLA = Comprehensive Environmental Reponse, Compensation, and Liability Act
CTCS = Chemical Tracking and Control System
D&D = Decontamination and Decommissioning
DOE = U.S. Department of Energy
EPCRA = Emergency Planning and Community Right-to-Know Act
FRERP = Federal Radiological Emergency Response Plan
FRMAP = Federal Radiological Monitoring and Assessment Plan
IM / IRA = Interim Measures / Interim Remedial Action
IWCP = Integrated Work Control Program
NPDES = National Pollutant Discharge Elimination System
OU = Operable Unit
RCRA = Resource Conservation and Recovery Act
SAR = Safety Analysis Review
SARA = Superfund Amendments and Reauthorization Act
SEA = Systems Engineering Analysis
TSCA = Toxic Substance Control Act
USQ = Unreviewed Safety Question Determinations
WEMS = Waste and Environmental Management System
WSRIC = Waste Stream Residue Identification and Characterization

'^MS) flats\graphics\fig1-1.fh3 8/4/94

1.4 PROJECT BACKGROUND

This IM/IRA/DD was developed by reviewing existing environmental monitoring program information for surface water, groundwater, air, incidental waters/foundation drains, and soils. Project personnel obtained information from all Industrial Area monitoring programs currently operating at RFP. This monitoring information was evaluated and proposed actions were provided to develop an integrated and comprehensive monitoring program to address current and future monitoring objectives within the Industrial Area. Integration of the existing monitoring program information and the overall assessment of current and future monitoring program requirements was developed through six primary tasks:

- review of existing data;
- assessment of contaminants and sources;
- identification of media-specific pathways;
- assessment of current monitoring programs;
- assessment of future monitoring programs; and
- assessment of incidental and foundation drain water management and treatment programs.

1.4.1 Review of Existing Data

Data gathering objectives (DGOs) were developed to provide an efficient means to acquire specific environmental information for the Industrial Area. The DGOs were specific for each environmental medium (groundwater, soil, surface water, incidental and foundation drain waters, and air) and involved the following processes:

- stating and defining the problem/goal;
- defining the boundaries of the problem;
- defining inputs to solve the problem; and
- defining the technical approach to solve the problem.

This DGO approach led to a more focused search and review of existing RFP monitoring information needed to meet the overall project objectives. In general, data acquisition activities for the Industrial Area IM/IRA/DD started early in October 1993 and ended late February 1994.

1.4.2 Assessment of Contaminants and Sources

Determining which chemicals should be monitored within the Industrial Area was critical to assessing the current monitoring programs. This task involved referencing and developing chemical listings (databases) that were determined to be chemicals that have historically been released or have the potential of reaching the Industrial Area environment. The COPCs were developed from chemicals identified from past spills or releases at IHSSs. Compounds of interest (COI) were developed by reviewing and assessing EG&G's chemical tracking and inventory databases of chemicals and wastes currently being stored in the Industrial Area.

1.4.3 Identification of Media-Specific Pathways

Potential contaminant transport pathways and mechanisms were reviewed or developed to assess the current monitoring system's capability to detect contamination before leaving the Industrial Area. Generally, the surface water pathways were determined by topographical maps and previous drainage studies conducted in the Industrial Area. Groundwater pathways were determined by developing potentiometric flow maps based on historical groundwater elevation data and by assessing the impact on groundwater migration as a result of building foundation drains. Incidental and foundation drain water pathways were determined by reviewing existing engineering drawings of building drains, and storm and sanitary sewer system piping. The air pathway was assessed by reviewing historical meteorological conditions and air dispersion modeling studies performed at RFP. Based on all the pathway information, a general Industrial Area conceptual site model was constructed.

1.4.4 Assessment of Current and Future Monitoring Programs

Based on the identification of contaminant pathways and COPCs and COIs, the existing Industrial Area monitoring programs could be evaluated on their ability to detect contamination before leaving the Industrial Area. The evaluation involved spatial distribution of monitoring locations, locations relative to contaminant pathways, monitoring frequency, and adequacy of analytical testing parameters based on the COPCs and COIs.

Six main activities were associated with assessing the monitoring system programs for future D&D activities:

- Conceptualize a verification monitoring program for site- and task-specific D&D activities that would complement building monitoring activities and engineering controls to ultimately detect contamination before it leaves the Industrial Area. The type and extent of verification monitoring would be a function of the real environmental hazard posed by the specific D&D activity.

- Develop general recommendations for pathway protection procedures that could be implemented at the actual location undergoing D&D activities to reduce the potential of contaminants entering the environment.

- Review new monitoring technologies for surface water and air that could be used during D&D activities and that could enhance the existing monitoring network.

- Develop a statistically based methodology for establishing baseline concentrations for each medium in the Industrial Area associated with D&D activities. Contaminant concentrations significantly exceeding these baseline concentrations would indicate potential problems with the pathway protection procedures or the site-specific monitoring for D&D activities and would prompt a response action.

- Outline preprogrammed responses for each medium of concern when chemical concentration or other conditions warrant a response action.

- Establish an administrative linkage that promotes communication and coordination between the D&D and the IM/IRA programs within the Industrial Area.

1.4.5 Assessment of Incidental and Foundation Drain Waters Management and Treatment Programs

For the purposes of this IM/IRA/DD, incidental waters are waters in building basements, valve vaults, and underground maintenance vaults. Groundwater and precipitation are the major sources of incidental and foundation drain waters. These waters are managed much differently than most surface waters in the Industrial Area and all have the potential of containing elevated concentrations of chemicals from contaminated groundwater or under-building contamination (UBC). The incidental water and foundation drain management plans go beyond pathway monitoring and involve the ultimate disposal of the water using onsite treatment systems. The proposed actions detailed in this IM/IRA/DD will enhance the existing incidental and foundation water management plan concerning onsite treatment options and water characterization activities. These enhancements will also allow all onsite treatment systems to accept and treat waters according to specific acceptance criteria.

1.5 INTERIM MEASURE/INTERIM REMEDIAL ACTION/DECISION DOCUMENT ORGANIZATION

The IM/IRA/DD is composed of the following 11 sections:

- Section 1.0, Introduction;
- Section 2.0, Site History and Characterization;
- Section 3.0, Constituents of Potential Concern, Compounds of Interest, and Sources;
- Section 4.0, Groundwater Monitoring;
- Section 5.0, Surface Water Monitoring;
- Section 6.0, Air Monitoring;
- Section 7.0, Incidental and Foundation Drain Waters;
- Section 8.0, Conceptual Site Model;
- Section 9.0, Decontamination and Decommissioning Activities;

- Section 10.0, Future Conceptual Site Model; and
- Section 11.0, Implementation Plan.

Sections 1.0 and 2.0 provide basic information on the background of the Industrial Area and the IM/IRA/DD project. Sections 3.0 through 8.0 represent chemical information, assessments, and proposed actions for the current conditions at RFP. These current transition monitoring programs in the Industrial Area are well established and the monitoring objectives are well defined; the specific actions for D&D activities are very site-specific and are not defined at this time. For this reason, the IM/IRA/DD separates the D&D activity monitoring (Section 9.0) from the current media-specific monitoring assessments. Therefore, the future site conceptual model (Section 10.0) provides a general discussion of potential contaminant pathways that may result from future D&D activities and potential engineering controls. Section-specific reference and appendix sections are included at the end of each section.

This Industrial Area IM/IRA/DD uses the historical terminology Rocky Flats Plant (RFP) instead of Rocky Flats Environmental Technology Site (RFETS) and Colorado Department of Health (CDH) instead of Colorado Department of Public Health and the Environment (CDPHE). Draft and draft final versions of the document were released prior to the name changes for these institutions. For consistency, the new names were not used in this decision document.

1.6 REFERENCES

Arbuckle, J. Gordon, Mary Elizabeth Bosco, David R. Case, Elliott P. Laws, John C. Martin, Marshall Lee Miller, Russell V. Randle, Richard G. Stoll, Thomas F.P. Sullivan, Timothy A. Vanderver, Jr., and Paul A.J. Wilson. 1989 (March). *Environmental Law Handbook*. Tenth Edition, Government Institutes, Inc. Rockville, MD.

EG&G Rocky Flats, Inc. 1993 (June 30). *Rocky Flats Plant Emergency Plan*. 1-64000-EP-01.00.

U.S. Environmental Protection Agency. 1991 (April). *Guide to Developing Superfund No Action, Interim Action and Contingency Remedy RODs*. Office of Solid Waste and Emergency Response Publication 9355.3-02FS-3.

Section 2.0

2.0 SITE HISTORY AND CHARACTERIZATION

2.1 SITE DESCRIPTION

RFP is a government-owned and contractor-operated facility that was part of the nationwide nuclear weapons production complex. The primary mission of the RFP was to produce metal components for nuclear weapons. RFP is currently in transition from a defense production facility to one whose future mission includes environmental restoration, waste management, and eventual D&D.

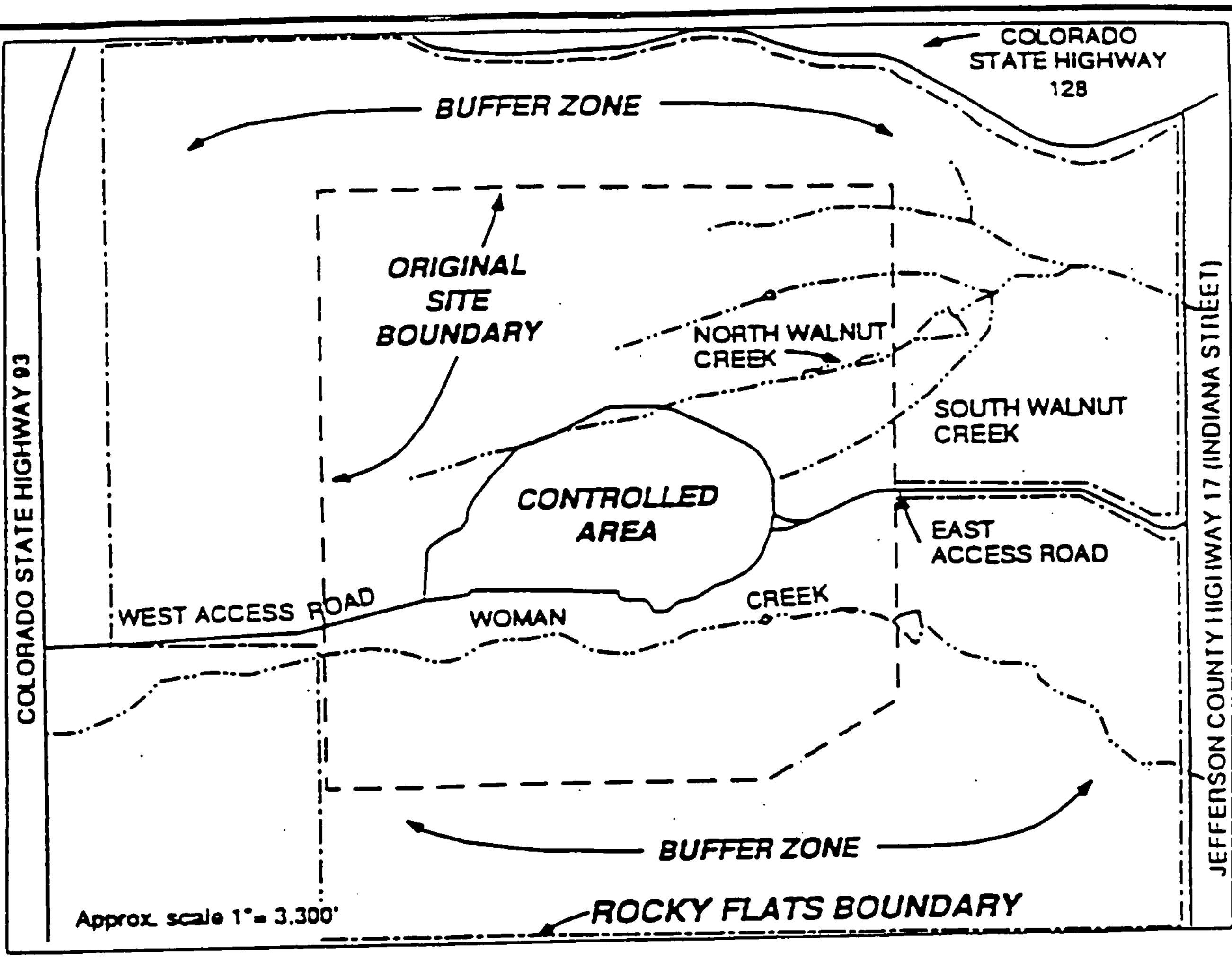
2.1.1 Location

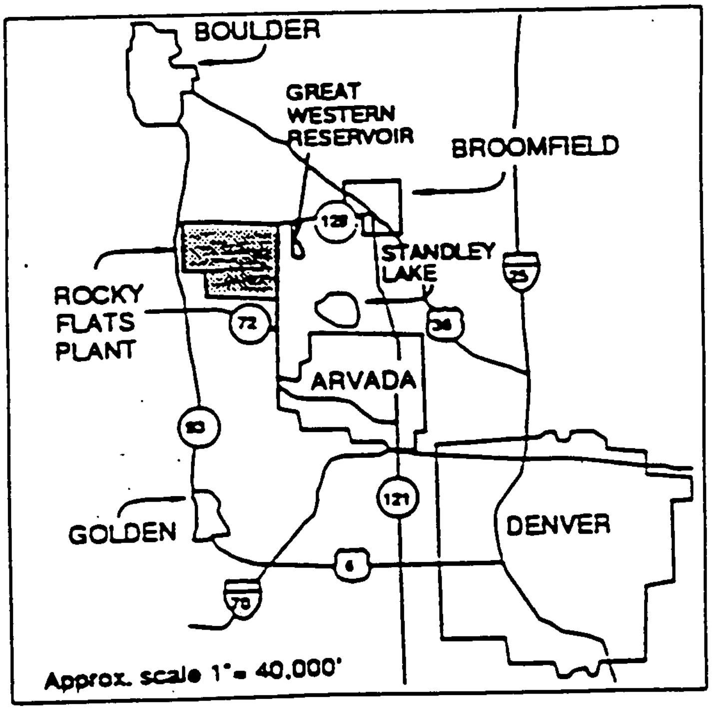
RFP is located in northern Jefferson County, Colorado, approximately 16 miles northwest of Denver (Figure 2-1). Other surrounding cities include Boulder, Broomfield, and Arvada, all of which are located less than 10 miles to the northwest, east, and southeast, respectively. RFP is bounded on the north by State Highway 128, on the east by Jefferson County Highway 17 (Indiana Street), on the south by agricultural and industrial properties and State Highway 72, and on the west by State Highway 93.

The plant consists of approximately 6,550 acres of federally owned land in Sections 1 through 4 and 9 through 15 of Township 2 South, Range 70 West. The majority of buildings located within the RFP site are concentrated in a 384-acre zone called the Industrial Area or Controlled Area. The Industrial Area is surrounded by an essentially unoccupied and approximately 6,150-acre buffer zone (Figure 2-1).

2.1.1.1 Surrounding Land Use and Population Density

The population, economics, and land use of areas surrounding RFP are described in a 1989 Rocky Flats vicinity demographics report prepared by U.S. Department of Energy





PREPARED FOR:
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

FIGURE 2-1
Industrial Area IM/IRA/DD
Location of Rocky Flats Plant
Rocky Flats Plant

R69009.MB013092

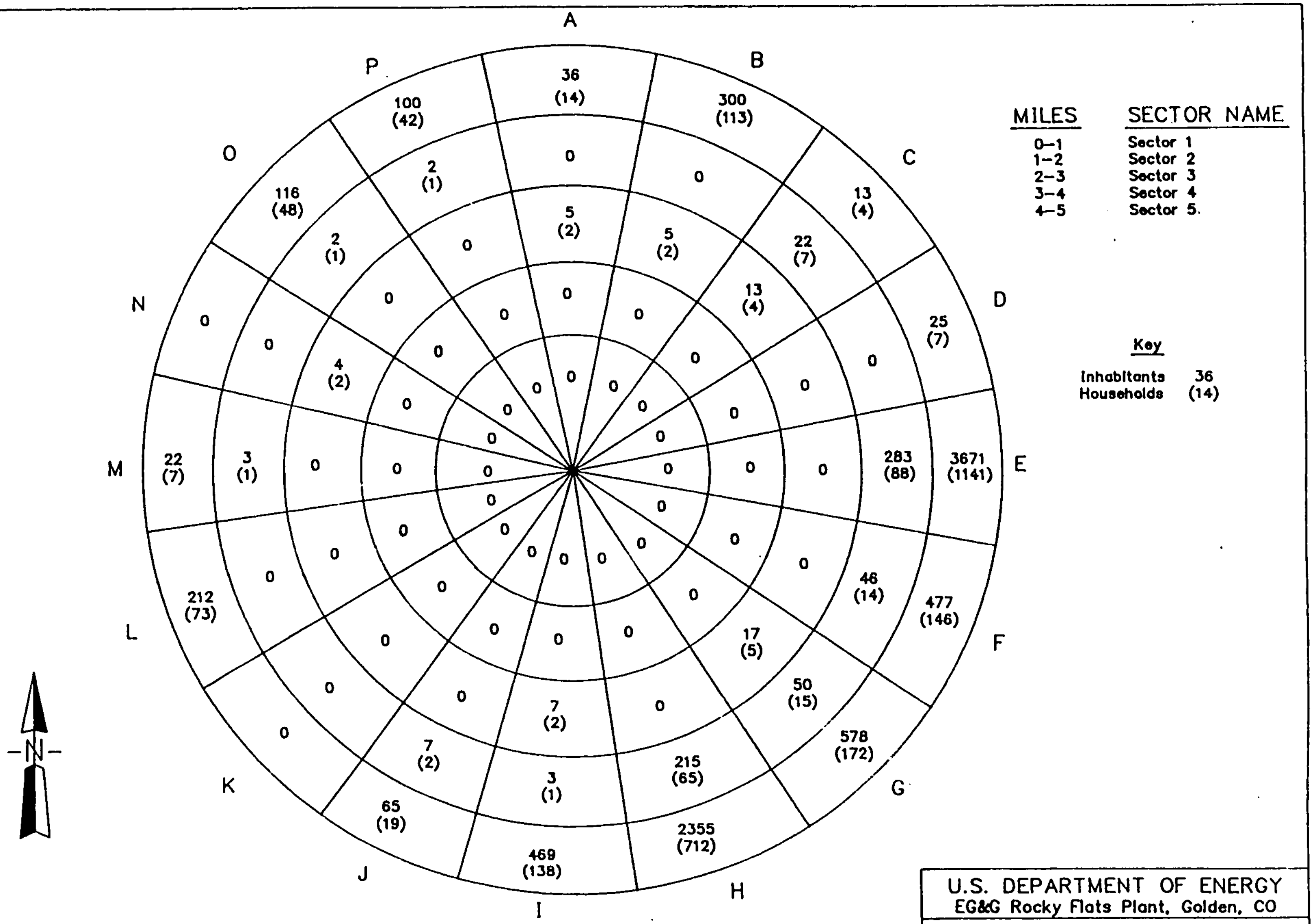
(DOE) (DOE 1990). This report divides general land use within 0 to 5 miles of RFP into residential, commercial, industrial, parks and open spaces, agricultural and vacant, and institutional classifications, and outlines current and future land use near the plant.

The majority of residential use within 5 miles (8 kilometers [km]) of RFP is located northeast, east, and south of the existing RFP. Figure 2-2 shows the 1989 population and residence distribution within a 5-mile radius from the center of RFP. Commercial development is concentrated near the residential developments around Standley Lake, primarily north and southwest, and around the Jefferson County Airport, which is located approximately 3 miles (4.8 km) northeast of RFP. Active industrial land use within 5 miles (8 km) of the plant is limited to quarrying and mining operations located on land directly west and southwest of the RFP property.

Several areas of industrially zoned property are located around RFP, both directly adjacent and nearby. This property is not likely to be developed any time in the near future because of lack of water for fire protection. Open-space land is located northeast of RFP near the City of Broomfield, in small parcels adjoining major drainages, and in small neighborhood parks in the cities of Westminster and Arvada. Standley Lake is surrounded by Standley Lake Park. Irrigated and nonirrigated cropland, producing primarily wheat and barley, are located northeast of RFP near the cities of Broomfield, Lafayette, and Louisville; north of RFP near Louisville and Boulder; and in scattered parcels adjacent to the eastern boundary of the plant. Several horse operations and small hay fields are located south of RFP.

2.1.1.2 Future Population and Land-Use Projections

Future land use in the vicinity of RFP will most likely involve continued suburban expansion, which will result in increasing density of residential, commercial, and industrial land use in the surrounding areas. The expected trend in population growth



Not To Scale

U.S. DEPARTMENT OF ENERGY
EG&G Rocky Flats Plant, Golden, CO

FIGURE 2–2
INDUSTRIAL AREA IM/IRA/DD
1989 Population Distribution
Within 5 Miles of the
Rocky Flats Plant Site
(Based on DOE 1990)

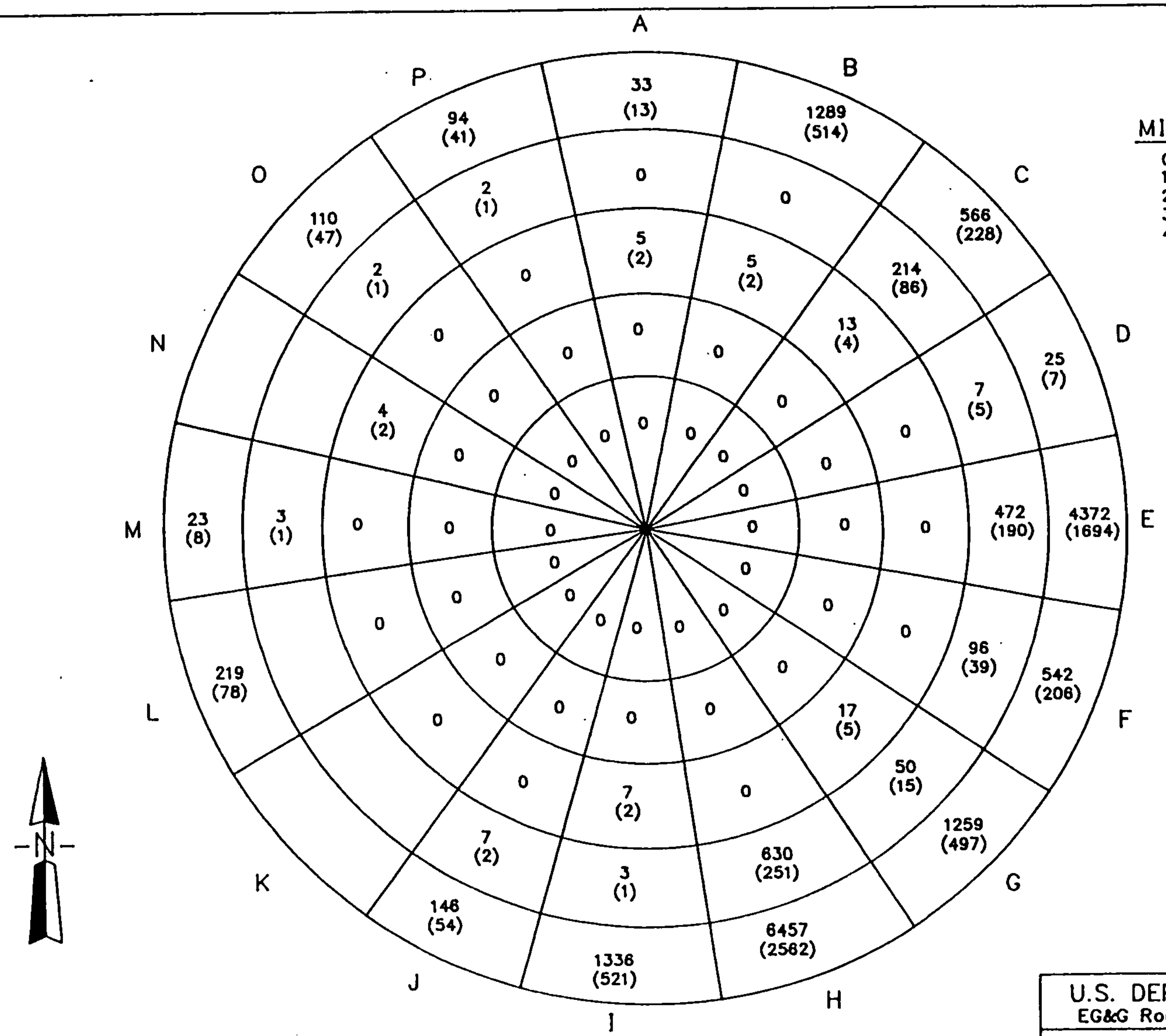
c:\rflats\sw\swfig22.dwg 06H60300

in the vicinity of RFP is addressed in the DOE demographics study (DOE 1990). This report considers expected variations in population density by comparing the 1989 setting to population projections for the years 2000 and 2010. DOE projections are based primarily on long-term population projections developed by the Denver Regional Council of Governments (DRCOG). Expected population density and distribution around RFP for the years 2000 and 2010 are shown in Figures 2-3 and 2-4, respectively. Table 2-1 summarizes the population data presented in Figures 2-2, 2-3, and 2-4. The rapid residential development of Rock Creek in the town of Superior, north-northeast of RFP, was not foreseen at the time of the 1989 report.

2.1.2 Description of Industrial Area

The Industrial Area, also known as the Controlled Area, is a 384-acre fenced security area, which contains the main production facilities. The main plant has 436 buildings, facilities, systems, and structures; 150 of these are permanent buildings, and 90 are trailers used mainly for office space (DOE 1992a; EG&G 1992a). The remaining facilities are smaller structures, additional temporary structures, or parts of systems on the site. Each facility is numbered according to its function.

The industrial facilities are divided by Central Avenue into two main areas, as shown in Figure 2-5. The Protected Area, to the north, contains all of the facilities related to plutonium operations. Security fences and intrusion-detection systems surround all buildings in which plutonium is handled or stored, and various other measures are used to provide safeguards and security. The area to the south of Central Avenue contains both nonplutonium manufacturing facilities, which are located in secured areas, and many of the general plant support facilities, some of which are in secured areas. Water treatment, utilities, and administration facilities are generally situated on the west end of Central Avenue, and waste treatment operations are situated near the east end.



MILES	SECTOR NAME
0–1	Sector 1
1–2	Sector 2
2–3	Sector 3
3–4	Sector 4
4–5	Sector 5

Key

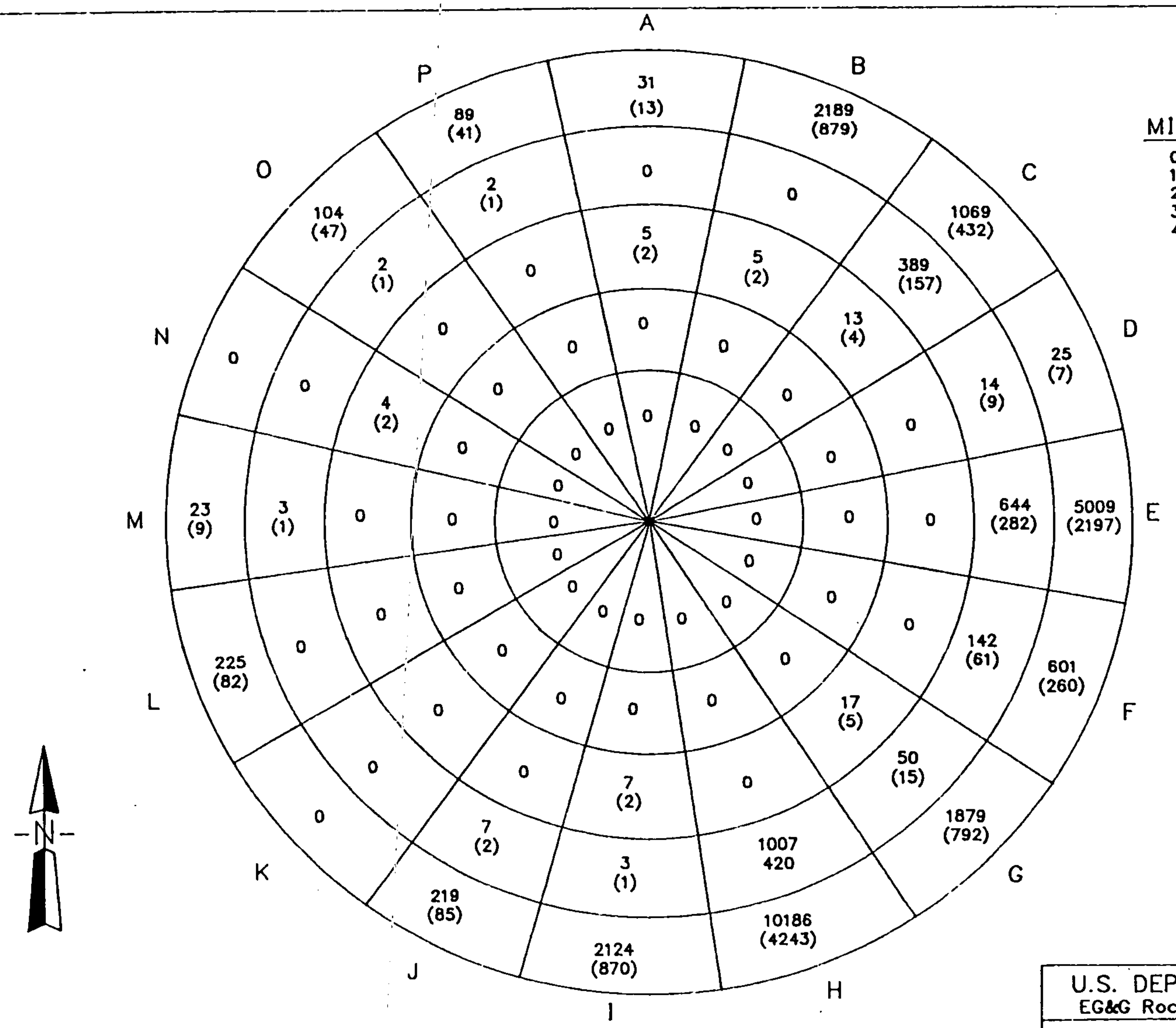
Inhabitants	36
Households	(14)

Not To Scale

U.S. DEPARTMENT OF ENERGY
EG&G Rocky Flats Plant, Golden, CO

FIGURE 2–3
INDUSTRIAL AREA IM/IRA/DD
Expected Population and Density Distribution Around The Rocky Flats Plant Site in the Year 2000
(Based on DOE 1990)

c:\rflats\sw\swfig23.dwg 05H60300



MILES	SECTOR NAME
0–1	Sector 1
1–2	Sector 2
2–3	Sector 3
3–4	Sector 4
4–5	Sector 5

Key

Inhabitants	36
Households	(14)

Not To Scale

U.S. DEPARTMENT OF ENERGY
EG&G Rocky Flats Plant, Golden, CO

FIGURE 2–4
INDUSTRIAL AREA IM/IRA/DD
Expected Population and Density Distribution Around The Rocky Flats Plant Site in the Year 2010
(Based on DOE 1990)

c:\rflats\ew\ewfig24.dwg 05H60300

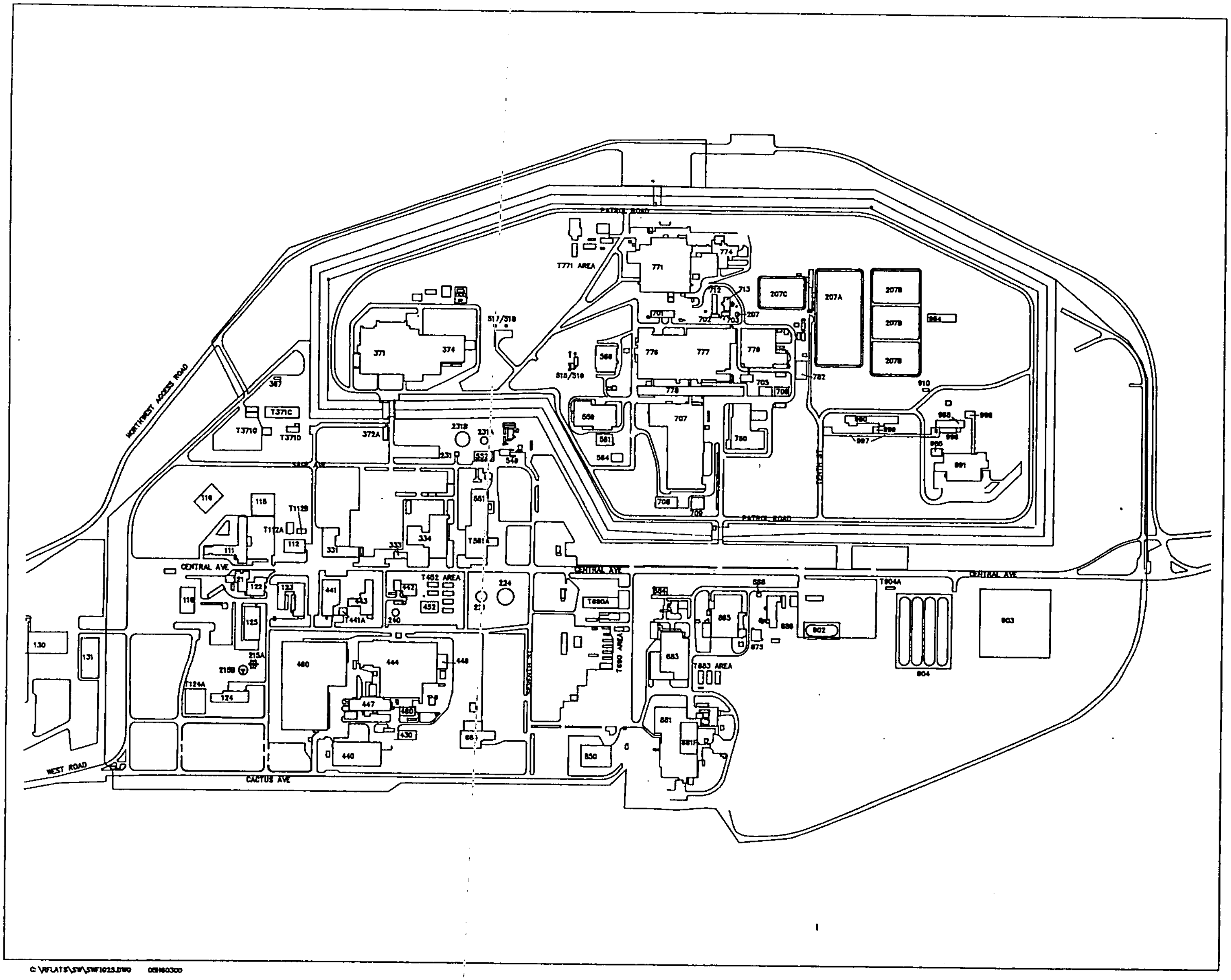
TABLE 2-1
Industrial Area IM/IRA/DD
Current and Projected Population in the Vicinity of the Rocky Flats Plant

Sector:	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	SUM
Year: 1989																	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	5	5	13	0	0	0	17	0	7	0	0	0	0	4	0	0	51
4	0	00	22	0	283	46	50	215	3	7	0	0	3	0	2	2	633
5	36	300	13	25	3,671	477	578	2,355	469	65	0	0	22	0	116	10	8,439
SUM	41	305	48	25	3,954	523	645	2,570	479	72	0	212	25	4	118	10	9,123
Year: 2000																	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	5	5	13	0	0	0	17	0	7	0	0	0	0	4	0	0	51
4	0	0	214	7	472	96	50	630	3	7	0	0	3	0	2	2	1,486
5	33	1,289	566	25	4,372	542	1,259	6,457	1,336	146	0	219	23	0	110	94	16,471
SUM	38	1,294	793	32	4,844	638	1,326	7,087	1,346	153	0	219	26	4	112	96	18,008
Year: 2010																	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	5	5	13	0	0	0	17	0	7	0	0	0	0	4	0	0	51
4	0	0	389	14	644	142	50	1,007	3	7	0	0	3	0	2	2	2,263
5	31	2,189	1,069	25	5,009	601	1,879	10,186	2,124	219	0	225	23	0	104	89	23,773
SUM	36	2,194	1,471	39	5,653	743	1,946	11,193	2,134	226	0	225	26	4	106	91	26,087

Refer to Figures 2-2 through 2-4 for sector locations. Source: DOE 1990.

U.S. Department of Energy

Rocky Flats Plant



Buildings and Structures

Roads/Fences

200 0 100 200 400
SCALE IN FEET

FIGURE 2-5
INDUSTRIAL AREA IM/IRA/DD
Rocky Flats Plant
Industrial Area

EG&G ROCKY FLATS
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

(intentionally blank)

2.1.3 History of Rocky Flats Plant

This section describes the history of plant operations, historical releases, and environmental monitoring at RFP.

2.1.3.1 Plant Operations

Construction of RFP was approved by the U.S. government in 1951. The purpose of the facility was to increase production of nuclear weapons components. Limited operations began in 1952 within a total site area of 2,520 acres and with a plant facilities area of less than 400 acres. Early operations involved 700,000 square feet of building floor space in 20 structures.

From 1952 to 1989, operations at RFP consisted of fabrication of nuclear weapons components from plutonium, uranium, and nonradioactive metals (principally beryllium and stainless steel). Parts made at the plant were shipped elsewhere for assembly. In addition, the plant reprocessed components for recovery of plutonium after they were removed from obsolete weapons. Other activities at RFP have included research and development (R&D) in metallurgy, machining, nondestructive testing, coatings, remote engineering, chemistry, and physics.

RFP was operated for the U.S. Atomic Energy Commission (AEC) from RFP's inception in 1951 until the AEC was dissolved in January 1975. At that time, responsibility for the RFP was assigned to the Energy Research and Development Administration (ERDA), which was succeeded by DOE in 1977. Dow Chemical USA, an operating unit of Dow Chemical Company, was the prime operating contractor of the facility from 1951 until June 30, 1975. Rockwell International (Rockwell) succeeded Dow Chemical USA on July 1, 1975. EG&G Rocky Flats, Inc., succeeded Rockwell on January 1, 1990.

2.1.3.2 Historical Releases

The RFP weapons-production operations generated nonhazardous, hazardous, radioactive, and mixed hazardous and radioactive waste streams (DOE 1987). Current waste handling practices involve both onsite and offsite recycling of hazardous materials and onsite storage of hazardous and radioactive mixed wastes, with the potential for offsite disposal of solid radioactive materials at another DOE facility. However, the RFP operating procedures historically included both onsite storage and disposal of hazardous, radioactive, and mixed wastes. Preliminary assessments under the Environmental Restoration (ER) Program have identified many of the past onsite accidental release sites and storage and disposal locations as potential sources of environmental contamination.

Hazardous substances that have been detected in the environment on the RFP as a result of plant operations include various radionuclides, nonradioactive metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and inorganic ions. These substances have been released to the environment through past waste management practices (e.g., outdoor storage or burial) and unplanned events such as leaks, spills, and fires.

Site-Wide Events and Responses. The following general significant events have occurred at RFP that have potentially affected the environment of the entire plant site:

- A major facility expansion was initiated in 1955 and referred to as Part IV construction. The expansion provided RFP with greater process capabilities and many more buildings and facilities. When the buildings went into operation, process liquid and solid waste were produced at a greater rate than before the expansion. Storage and disposal of the wastes became a major concern.

- In 1957, a fire occurred in Building 771, a plutonium recovery facility, that caused the air effluent plenum filters to be breached. In addition to airborne releases as a result of the fire, fire-fighting efforts and cleanup activities contributed to releases to the environment.

- A second major plant expansion, Part V construction, began in 1967, prompting increased manufacturing capabilities and waste-producing activities. Significant environmental cleanup efforts of waste produced during the 1950s and early 1960s were initiated at the same time.

- Storage of plutonium-contaminated cutting oils at the area now called the 903 Pad resulted in soil contamination through drum leakage. The last drums were removed in June 1968, and an asphalt cover over the drum storage area was completed in November 1969. Resuspension and wind dispersion of contaminated soil from outside the covered area is a major source of environmental releases at RFP.

- In 1969, a fire occurred in Buildings 776 and 777 that spread contamination into the buildings, the surrounding asphalt and soil, and the atmosphere. Subsequent cleanup activities produced a significant amount of fire wastes that were stored and/or disposed of at RFP.

- Following the 1969 fire, waste storage problems increased, and concerns were heightened regarding the potential for offsite releases via air, surface water, and groundwater. In addition to contamination cleanup activities, waste management procedures were altered to reduce potential for releases to the environment. Detention ponds in the drainages were upgraded, and additional controls were installed to monitor surface water before offsite discharge.

- In 1974, DOE purchased additional land surrounding the plant, which expanded the buffer zone and further isolated the Industrial Area from surrounding communities.

Individual Hazardous Substance Sites. The IAG was signed in January 1991 among CDH, EPA, and DOE. The agreement sets forth the regulations, requirements, and dates for achieving compliance with both CERCLA and RCRA environmental regulations. The IAG identified 117 IHSSs at RFP. These IHSSs, designated 101 through 217, were identified through a search of RFP records, employee interviews, and aerial photographic interpretation.

An IHSS is defined as a location associated with the threatened or actual release of hazardous substances that may cause harm to human health and the environment, and includes sites where leaks, spills, or chemical storage may have occurred. The 117 numbered IHSSs include a total of 178 separate sites, and are grouped into 16 operable units (OU) for purposes of conducting field investigations and remediation activities. The Industrial Area contains OU4 (Solar Ponds), OU8 (700 Area), OU9 (Original Process Waste Lines [OPWL]), OU10 (Other Outside Closures), OU12 (400/800 Areas), OU13 (100 Area), OU14 (Radioactive Sites), OU15 (Inside Building Closures), and OU16 (Low Priority Sites). The OUs, associated IHSSs, and COPCs in the Industrial Area are discussed in greater detail in Section 3.0 of this report.

2.1.3.3 History of Environmental Monitoring

Since the inception of the RFP in 1951, routine monitoring has been conducted for potential RFP-derived contaminants in various environmental media. In addition to routine monitoring, numerous studies have been undertaken to characterize the RFP environment and to identify and characterize potential sites of environmental contamination at the RFP. These efforts have been driven by AEC, ERDA, and DOE policy, and by state and federal environmental regulations that have been promulgated during the operating history of the RFP. Specific sampling and analysis programs for various media have evolved through the history of RFP operations.

Groundwater. Groundwater monitoring wells were installed at RFP as early as 1954 to monitor groundwater for radionuclides and other parameters. At least three wells were installed before 1960. In 1960, six monitoring wells were installed near the Solar Evaporation Ponds (SEPs) to investigate leakage of water from the Solar Ponds. Six wells were added in 1971, 17 in 1974, 10 in 1980, 10 in 1981, and seven in 1982, resulting in a total of at least 59 wells installed by 1986. Wells in the RFP groundwater monitoring network were sampled annually until 1974, then semiannually until 1980, when sampling was increased to three times per year. Since 1982, monitoring wells have been sampled quarterly.

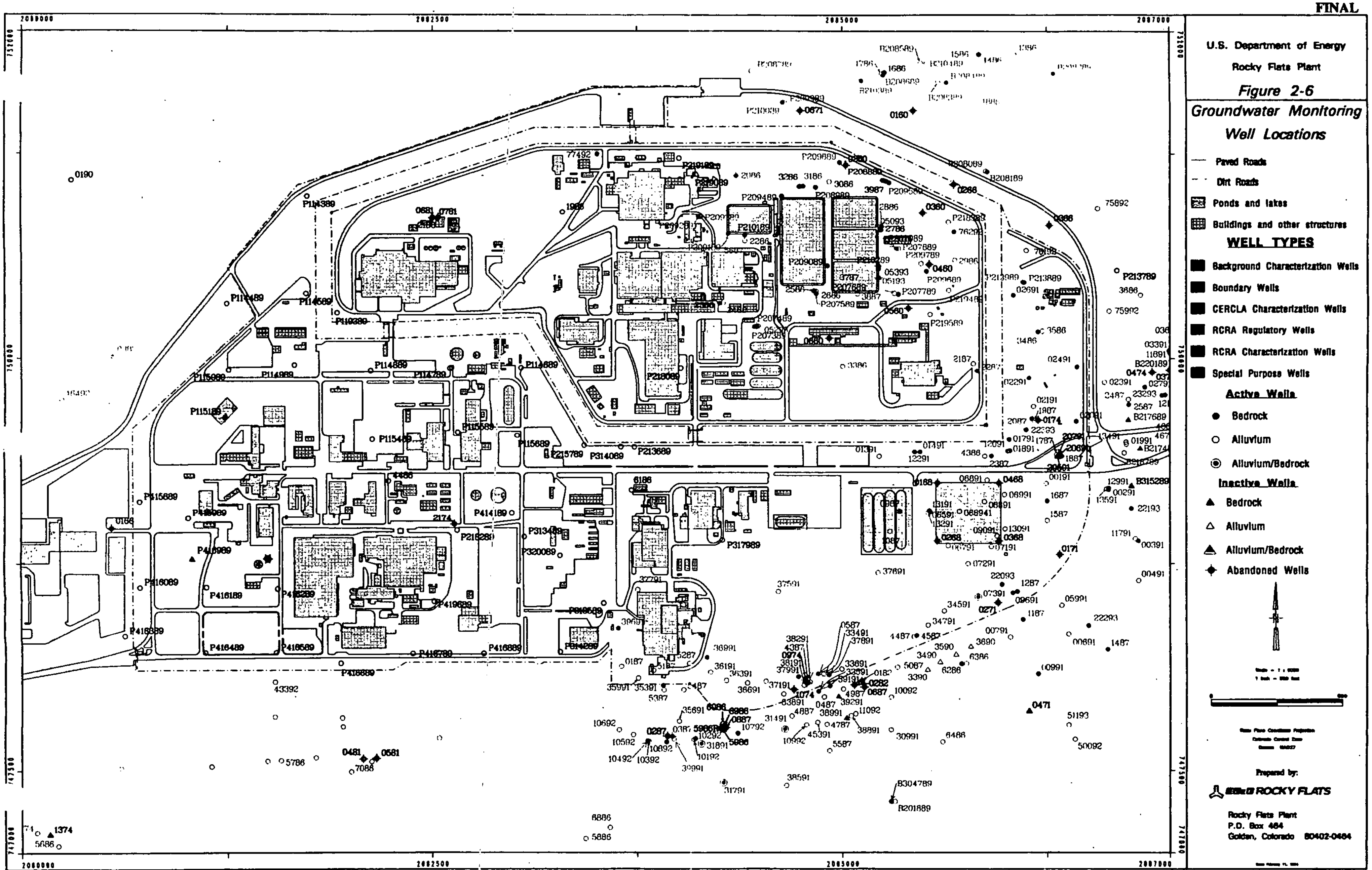
Groundwater samples have always been analyzed for radionuclides. More chemical parameters were added to the routine analyte list in 1974, 1979, and 1985. Beginning in 1985, additional analytes such as VOCs, trace metals, and major ions were added to the sampling routine.

Seventy monitoring wells were installed in 1986 to (1) characterize facility-wide hydrogeology and groundwater quality at RFP, and (2) satisfy the RCRA Subpart F requirements. An additional 67 wells were installed in 1987 to characterize groundwater quality and flow at various IHSSs and the three RCRA-regulated units (SEPs, West Spray Field, and Present Landfill). No monitoring wells were installed in 1988. A total of 163 wells and piezometers were installed in 1989; 53 of these wells were installed for monitoring purposes at RCRA-regulated units, and approximately 50 piezometers were installed in the Industrial Area for the purpose of collecting water-level measurements for hydrogeologic characterization. Seventeen alluvial wells and piezometers were installed in 1990 for the purpose of background characterization and landfill siting. During 1991, 85 alluvial wells, 11 alluvial/bedrock wells, and 46 bedrock wells were installed, mostly in the Mound, East Trenches, and 881 Hillside areas. During 1992, 25 alluvial wells, one alluvial/bedrock well, and 12 bedrock wells were installed. An additional 42 wells were installed during 1993. All known (surveyed) existing and abandoned wells in the Industrial Area are shown in Figure 2-6.

Currently there are 371 active wells and 84 piezometers in the RFP groundwater monitoring network. One hundred eighty-three wells and piezometers are located in the Industrial Area. As discussed more completely in Section 4.0, 25 existing wells, four completed in bedrock and the others in alluvium, are proposed for quarterly monitoring for IM/IRA/DD purposes.

Surface Water. Environmental monitoring of wastewater began in 1952 with measurement of total radiation. Water was only released if it met federal guidelines for radionuclides. During those initial years, monitoring information was not available to the public because of government policies related to nuclear weapons fabrication. Annual reports describing environmental activities were initiated in 1969 and were released to the public. In the early 1970s, RFP became the first federal weapons facility to release environmental information to the public through a monthly information exchange meeting with CDH, EPA, and participating cities. Until 1974, water quality regulation at the RFP was primarily conducted by DOE and predecessor agencies. In 1974, EPA issued the first National Pollutant Discharge Elimination System (NPDES) discharge permit for RFP, establishing external control of effluent concentration limits for contaminants.

Monitoring and surface water management practices are in place to maintain discharge limits requested by CDH in the Agreement in Principle (AIP) signed by the State of Colorado and DOE in 1989. This agreement expanded previous arrangements called Memorandums of Understanding dating back to 1979, which gave CDH authority to sample and analyze water before offsite discharge.


U.S. Department of Energy
Rocky Flats Plant
Figure 2-6
Groundwater Monitoring
Well Locations
Paved Roads
Dirt Roads
Ponds and lakes
Buildings and other structures
WELL TYPES
Background Characterization Wells
Boundary Wells
CERCLA Characterization Wells
RCRA Regulatory Wells
RCRA Characterization Wells
Special Purpose Wells
Active Wells
Bedrock
Alluvium
Alluvium/Bedrock
Inactive Wells
Bedrock
Alluvium
Alluvium/Bedrock
Abandoned Wells
Prepared by:
EG&G ROCKY FLATS
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

(intentionally blank)

Foundation drains have been identified for 20 buildings in the Industrial Area. Additionally, 71 utility pits exist (EG&G 1993a). Water quality historical data are limited and only address foundation drains and building sumps.

Air. Air monitoring programs at RFP started in the early 1950s and can be divided into two general programs: effluent emissions monitoring and ambient air monitoring. Radiological monitoring of particulate effluent emissions from stacks and vents before July 1973 was focused on total long-lived alpha (TLLA) activity. From mid-1973 through 1977, particulate samples from plutonium exhaust ducts were collected weekly and analyzed for plutonium. Beginning in 1978, particulate samples from each exhaust system were composited into monthly samples for specific laboratory analysis of the plutonium, americium, and uranium isotopes following the TLLA determination.

Real-time detection and automatic alarms for abnormal emissions began in the mid-1960s with Selective Alpha Air Monitors (SAAMs), formerly called Continuous Air Monitors or CAMs. These monitors, located primarily in the plutonium facility air emission ventilation systems, were designed and constructed at RFP until the early 1970s when commercial models became available. At that time, RFP began using a RADēCO Model 441 alpha-detecting instrument. Since then, updated models have been added to the monitoring network, including RADēCO Models 442 and 442ARF.

A tritium sampling program began in the mid-1970s after processing a shipment of plutonium during 1973 that, unknown to RFP personnel, had become contaminated with tritium at another facility. To prevent recurrence of such an incident, more stringent procedures were established to detect tritium and additional radionuclides in all incoming shipments and plant emissions.

Radiological monitoring of ambient air quality has been conducted in various forms since 1952. Early measurements were performed within the immediate vicinity of RFP using hand-held devices to measure TLLA activity. Steady improvement in technology and expansions in the program to include a larger geographical area led to continuous sampling of particulates by high volume air samplers and to radiochemical analysis of sample filters.

Intermittent nonradiological monitoring of Clean Air Act (CAA) National Ambient Air Quality Standards (NAAQS) criteria pollutants began in the late 1970s. In 1981 and 1982, this program was updated to include the installation of new particulate samplers (for total suspended particulates [TSP]) and continuous monitors for measurement of ambient levels of sulfur dioxide (SO_2), oxides of nitrogen (NO_X), carbon monoxide (CO), ozone (O_3), and the analysis of TSP filters for lead. A self-contained van, equipped for mobile ambient air monitoring, was operated at numerous locations onsite from 1982 through 1989. Sampling for PM-10 (particulate matter less than 10 micrometers [μm] in diameter) began in 1988 following the establishment of EPA PM-10 regulations in July 1987. After the development of a plant-specific baseline and a review of regulatory requirements, the determination was made in 1989 to discontinue all but the particulate sampling efforts. During this NAAQS sampling program, no valid measurements exceeding standards were recorded.

Soil. An annual soil monitoring program for radionuclides has been conducted since 1972, except for the period between 1978 and 1983. Plutonium concentrations have been determined since 1972, and on selected samples, americium concentrations have been determined since 1988. Before that time, only plutonium concentrations were measured (EG&G 1991a; EG&G 1992b).

2.1.4 Future of Rocky Flats Plant

On September 27, 1991, the President of the United States announced the cancellation of several nuclear-weapons programs, leaving the Trident II missile as the only remaining system requiring fabrication of plutonium components at Rocky Flats. This requirement was eliminated in January 1992, when the President decided to cancel further production of the Trident II missile and its associated nuclear warhead, the W-88.

2.1.4.1 New Mission

On February 10, 1992, the Secretary of Energy submitted a report to Congress from DOE regarding RFP. Various new missions were defined, including (1) cleaning out and stabilizing production process systems, (2) decontaminating obsolete and/or excess buildings and facilities, (3) processing plutonium residues in preparation for transport to storage/disposal sites, (4) possibly transferring nonplutonium manufacturing to other locations, (5) maintaining a contingency status in Building 707 pending final decisions from the reconfiguration Programmatic Environmental Impact Statement (PEIS), and (6) providing technical assistance in developing the design of a replacement facility to be evaluated in the PEIS. The production contingency status of Building 707 has since been canceled.

2.1.4.2 Transition

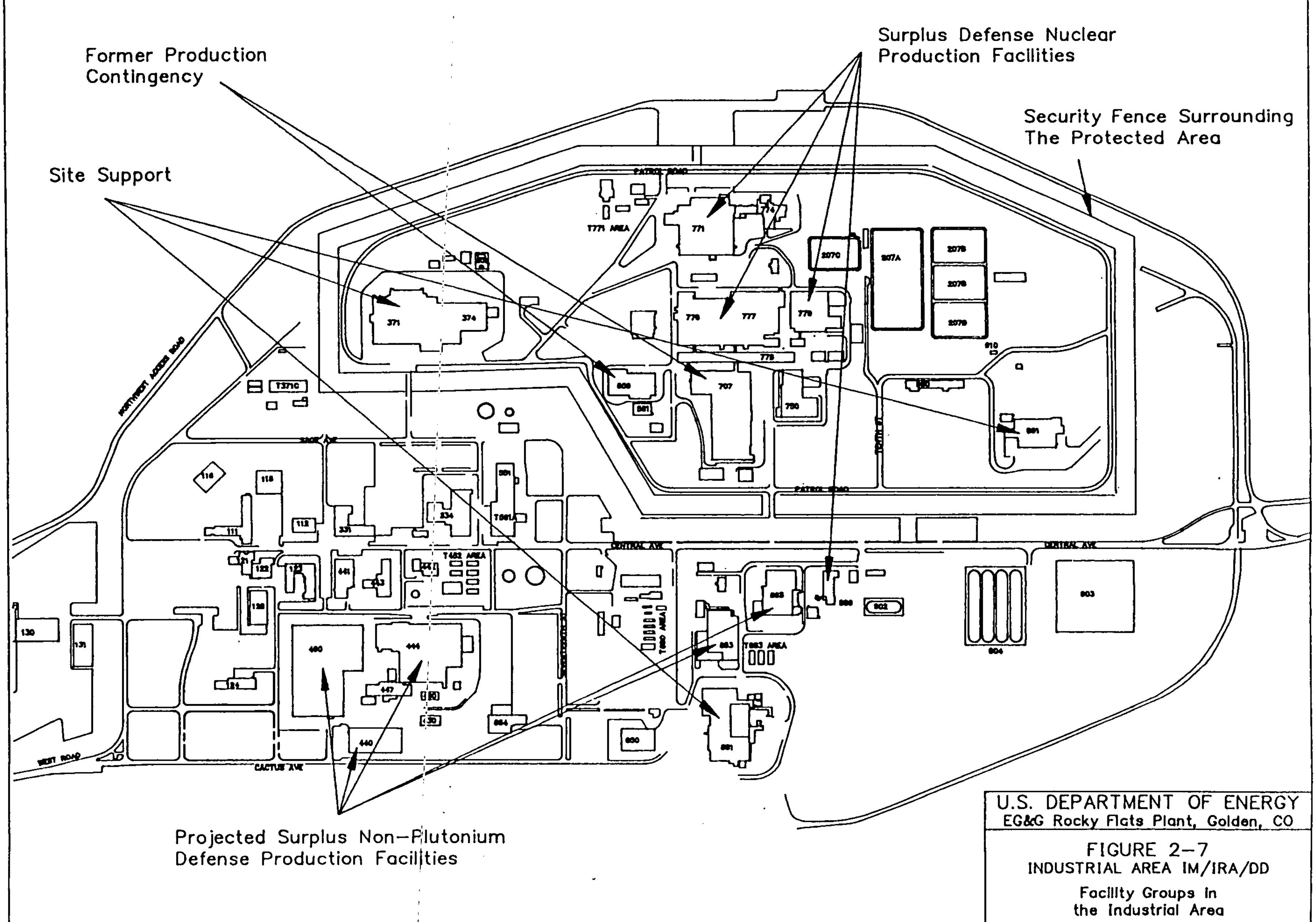
The process of converting the RFP from the historical mission to the new mission, and the time it consumes, is known as "transition." The plant must change modes of operation, consolidate material, reduce risk, disassemble and reassemble organizationally, and physically and conceptually convert to the new mission. Transition begins when an operating facility is formally declared surplus. Responsibility for the facility is formally turned over to the Office of Environmental Restoration and Waste Management. The end result of transition is the final disposition of the facility and its individual buildings, and conversion of the facilities for end use. Several alternatives are under consideration for the end use of the plant and its potential economic development.

Each facility on RFP is planned for eventual transition and/or D&D (EG&G 1992a). Nineteen structures contain the majority of special nuclear material (SNM), classified product and document inventories, hazardous chemical inventories, and radioactive and chemical contamination on the plant. The RFP facilities have been classified into five facility groups: (1) Surplus Defense Nuclear Production Facilities (Buildings 771, 776, 779, and 886); (2) Projected Surplus Non-Plutonium Defense Production Facilities (Buildings 439, 440, 444, 460, 865, and 883); (3) Waste and Environmental Facilities (Buildings 374, 664, and 774); (4) Site Support Facilities (Buildings 130, 131, 111, and 115; T115, T116, and T111, and T130 Trailers; Buildings 441, 452, 750, 850, 893, 119, 122, 123, 124, 125, 331, 333, 334, 443, 442, 790, 561, 778, 061, 551, 371, 881, and 991); and (5) former Production Contingency Facilities (Buildings 707 and 559). As noted previously, the production contingency mission of RFP has been canceled. Major buildings and facility groups are shown in Figure 2-7.

Transition for each building has been planned in phases. The initial phase is dependent on the building group. Surplus Defense Nuclear Production Facilities are currently in the Limited Operations Phase. Plutonium production operations are curtailed, and the ongoing activities in these facilities are essential to maintaining safety and safeguards-regulated systems. The Projected Surplus Non-Plutonium Defense Production Facilities will remain operational in the initial phase and will continue to complete manufacturing commitments for defense programs until Non-Nuclear Production is consolidated elsewhere.

The second phase, Waste Operations and Material Consolidation, includes initial facility characterization, SNM and classified matter consolidation, and the stabilization and removal of hazardous materials. The Deactivation Phase follows, during which facilities will be completely transitioned in accordance with Rocky Flats Plant Environmental Management (EM) criteria and standards. The final phase is Decontamination-Ready,

FINAL



U.S. DEPARTMENT OF ENERGY
EG&G Rocky Flats Plant, Golden, CO

FIGURE 2–7
INDUSTRIAL AREA IM/IRA/DD
Facility Groups in
the Industrial Area

Source: Mission Transition Program Management Plan (EG&G 1992a)

c:\rflats\ew\ewfig27.dwg 05H60300

a holding phase in which a building will be safely maintained until final decisions on its disposition are made.

2.1.4.3 Decontamination and Decommissioning

D&D activities will follow the transition phase. In general, D&D involves the removal and decontamination of fixed materials, equipment, facilities, and building structures that were not removed under the transition phase.

D&D activities may include removal of fixed equipment, piping, and tanks; retrofitting equipment; dismantling and removing ventilation systems; modifying or renovating buildings; dismantling or demolishing buildings; constructing buildings; and excavating underground contamination or UBC, equipment, and structures.

2.2 PHYSICAL SETTING

Topography, surface water hydrology, regional geology, site geology, hydrogeology, climate and meteorology, and ecology are presented in this section.

2.2.1 Topography

RFP is situated along the eastern edge of the southern Rocky Mountain region immediately east of the Colorado Front Range. RFP is located on a broad, eastward-sloping (approximately 1 degree) plain of coalescing alluvial fans, at an elevation of approximately 6,000 feet above mean sea level (msl). Locally, this plain originates near the mouth of Coal Creek Canyon, extends about 5 miles in an eastward direction, and terminates at a break in slope to low rolling hills. The alluvial surface is dissected by a series of east-northeast trending, stream-cut valleys. The Industrial Area is located near the eastern edge of the fans on a terrace between the stream-cut valleys of North Walnut Creek on the north and Woman Creek on the south.

2.2.2 Surface Water Hydrology

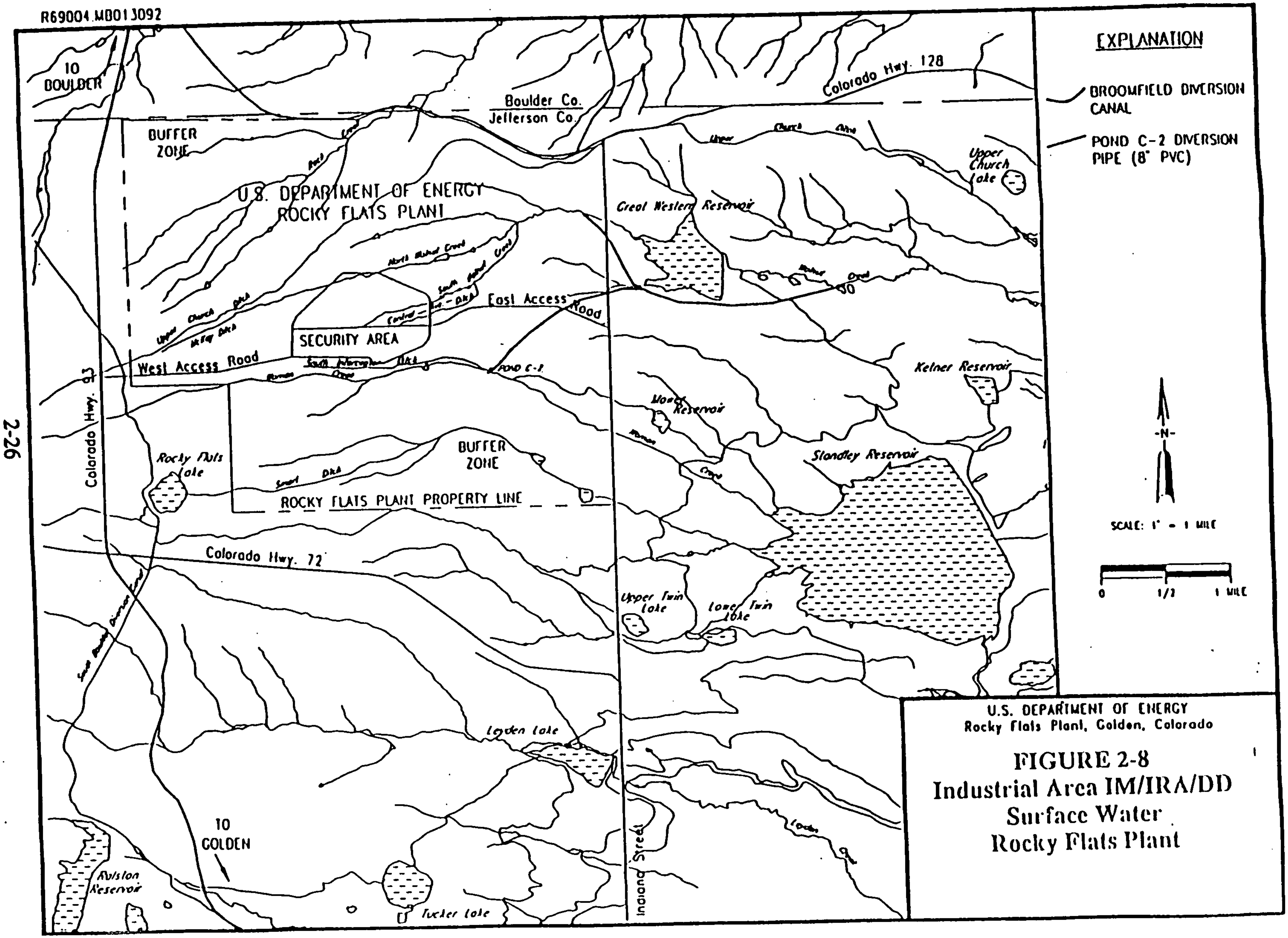
RFP is drained by three intermittent streams: Rock Creek, Walnut Creek, and Woman Creek (Figure 2-8). The northwestern corner of the plant is drained by Rock Creek, which flows northeast through the buffer zone to its offsite confluence with Coal Creek. Coal Creek flows into Boulder Creek, then St. Vrain Creek, and eventually into the South Platte River. No runoff from the Industrial Area drains into Rock Creek.

The northern part of the Industrial Area is drained by North and South Walnut creeks and an unnamed tributary. The three forks of Walnut Creek join in the buffer zone and flow toward Great Western Reservoir, which is approximately 1 mile east of the confluence. However, the Walnut Creek flow is rerouted around Great Western Reservoir into Big Dry Creek through the Broomfield Diversion Canal, which is operated by the City of Broomfield.

The Walnut Creek and Woman Creek drainages are separated by an east-west trending surface water divide (interfluve). Woman Creek originates to the west of the RFP, drains the southern part of the RFP buffer zone, and flows eastward into Pond C-1. The outflow from Pond C-1 flows offsite to the east, partly into Mower Reservoir and primarily into Standley Lake.

The South Interceptor Ditch (SID), located between the Industrial Area and Woman Creek, collects runoff from the southern part of RFP and ultimately diverts the water to Pond C-2. Waters from Pond C-2 are treated and monitored in accordance with the plant NPDES permit. Water from Pond C-2 that meets water quality requirements is transferred to the Broomfield Diversion Canal.

R69004.MB013092



U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

FIGURE 2-8
Industrial Area IM/IRA/DD
Surface Water
Rocky Flats Plant

radionuclides in the soil (EG&G 1992d). Plutonium and americium concentrations at annual monitoring locations outside this zone exhibit much less variation and are typically very close to background levels. None of the annual monitoring locations fall within the Industrial Area.

The Remediation Site monitoring is specific to each OU and includes the RI areas and the buffer zone east of the Industrial Area. The scope of the Remediation Site Soil Monitoring Program is defined by the IAG, which requires soil sampling of OU1 (881 Hillside), OU2 (903 Pad, Mound, and East Trenches), and OU3 (offsite). Additional sampling is being conducted in OU5 (Woman Creek) and OU6 (Walnut Creek). The general intent of these sampling efforts has been to determine the nature and extent of organic, inorganic, and radionuclide contamination in soils and sediments at IHSSs. Most of these efforts are expected to be one-time sampling events to guide future work, but OU2 shallow vadose-zone water movements are being studied at five soil trench locations immediately outside the southeastern portion of the Industrial Area. The movement of interstitial water and radionuclides in the vadose zone at these locations is monitored continuously, and the water is periodically analyzed for total, dissolved, and colloidal plutonium and americium, in addition to a suite of physical parameters. Two different methods have been used in sampling soils at RFP. The annual soil monitoring in the buffer zone is performed using RFP Standard Operating Procedure (SOP) GT.08, in which 10 subsamples are composited from two 1-meter squares within a 30-meter-square sample plot. Recent sampling in support of the OU2 RI (EG&G 1993e) was performed using a method developed by CDH, which uses 25 subsamples composited from a much larger sample plot, either 2.5 or 10 acres in size. The CDH method has the advantages of a more representative sample from the air-soil interface and should be less affected by topographic/homogeneity problems as a result of the larger number of subsamples. A disadvantage is the amount of disturbance to the sample plot each time it is sampled. The RFP method has the advantage of sampling a relatively undisturbed sample plot to a depth that would also measure radionuclides transported down into the

2.3.4 Soils Monitoring

The purpose of the Soil Monitoring Program is to characterize temporal changes in plutonium concentrations across RFP, as well as spatial and vertical distribution of plutonium according to specific remediation areas. The Soil Monitoring Program is divided into the following two subprograms:

- Site-Wide Soil Monitoring - monitors annual changes in plutonium concentrations, possibly occurring through soil resuspension and other mechanisms.

- Remediation Site Soil Monitoring - monitors the spatial and vertical extent of plutonium and americium in soils of the RI areas and in the buffer zone east of the main facilities area.

Currently, an active soil monitoring program is not in place in the Industrial Area, although soil sampling is expected to be an integral part of D&D activities and continued OU investigations. The existing program to monitor plutonium concentrations in buffer zone soils is discussed below, along with recent soil sampling that has occurred in the Industrial Area.

The site-wide program consists of annual sampling for plutonium and americium at 1- and 2-mile radii (1.6 and 3.2 km) from the center of the plant. This radial grid was chosen to investigate plutonium distribution patterns using RFP as a point source. Samples are collected from 40 monitoring sites (30 meters square) at 18-degree intervals along the circumferences of the two circles (Figure 2-14). Data from the composite samples are evaluated for changes in americium and plutonium concentrations (since 1988) as a result of soil resuspension or other mechanisms. Some variation has been observed from year to year, particularly within a 120-degree swath east and southeast of the 903 Pad, but this has been attributed to heterogeneity of the wind-deposited

- Sediment Sampling - monitors sediments to determine the fate and transport of contaminants adsorbed by sediments and to determine source areas of contaminants.

2.3.3 Air Quality Monitoring

The purpose of the Air Quality Monitoring Program is to protect the health of plant workers and the general public and to comply with applicable state and federal air quality regulations through the detection and measurement of air emissions and ambient air conditions. The Air Quality Monitoring Program is divided into four subprograms on the basis of functional objectives. These programs, along with their monitoring objectives, are as follows:

- Radiological Effluent Emissions Monitoring - monitors particulate emissions of building exhaust ducts for plutonium, americium, and uranium; gaseous emissions of building exhaust ducts for tritium; and real-time detection and automatic alarms for abnormal alpha activity.

- Nonradiological Effluent Emissions Monitoring - monitors building exhaust and duct emissions for beryllium.

- Radiological Ambient Air Monitoring - monitors ambient air concentrations of plutonium particulates within and near RFP and in nearby communities, and monitors ambient plutonium concentrations within specific OUs for remediation activities pursuant to the IAG.

- Nonradiological Ambient Monitoring - monitors nonradioactive suspended particulates in ambient air in accordance with EPA regulations on criteria pollutants (TSP and PM-10).

2.3.2 Surface Water Monitoring

The Surface Water Monitoring Program is designed to monitor for various constituents to ensure compliance with regulations, permits, and agreements; to locate the sources of potential surface water contamination; and to develop a comprehensive water quality database to assist with surface water management. This monitoring program is divided into five subprograms on the basis of functional objectives. These programs, along with their monitoring objectives, include the following (EG&G 1992b):

- Regulatory Compliance Monitoring - monitors discharges from detention ponds in Walnut Creek and Woman Creek drainages and from the WWTP outfall for chemical, biological, and radionuclide constituents.

- Routine Operational Monitoring - monitors various detention ponds, WWTP, and sites within the main facilities area to characterize water quality from source areas that discharge to Walnut Creek and Woman Creek.

- Routine Site-Wide Surface Water Monitoring - monitors seeps and drainages within RFP in support of RFI/RI characterization objectives. This monitoring program also identifies areas possibly affected by contaminant releases from suspected source areas and compares surface water quality from these areas with water from areas not affected by RFP. This program currently consists of weekly monitoring at three locations for OU2.

- Site-Wide Storm Event Monitoring - monitors surface water quality and flows during rainfall, snowmelt, and pond discharge events at stations along Woman Creek, Walnut Creek, and Rock Creek within the RFP boundary.

currently classified as RCRA, CERCLA, Background, Boundary, or Special Purpose. Figure 2-6 shows the locations of monitoring wells in and near the Industrial Area.

RCRA wells are in place at the three RCRA-regulated units at RFP (SEPs, West Spray Field, and Present Landfill). Wells at these RCRA units serve two purposes: (1) upgradient and downgradient RCRA-boundary wells are used to obtain chemical data for statistically assessing potential releases from the units; and (2) RCRA-characterization wells are used to evaluate the nature and extent of contamination and contaminant migration rates, in accordance with the assessment and alternate programs for the units. CERCLA characterization wells have been installed at OUs that have been, or are currently, under investigation. Each of these wells has a specific purpose related to the objectives of remedial investigations (RIs) at the OU. Long-term (more than two years) monitoring of these wells for characterization purposes is usually not required. Wells classified for background characterization have been used to provide background groundwater quality data. Boundary wells have been installed to monitor groundwater quality as it leaves the site, or at other points of compliance. Special purpose wells have been installed for use in general site characterization programs, to detect leaks or other chemical releases to the environment, for specific investigations such as the nitrate contamination investigation in the SEPs area, and for monitoring the performance of dams or other engineered structures.

The analytical suite for groundwater samples (the "standard suite") consists of the following analytes and analyte groups: Target Compound List (TCL) VOCs; water quality parameters; nitrate/nitrite as nitrogen; Contract Laboratory Program (CLP) Target Analyte List (TAL) standard and additional metals (dissolved); tritium, plutonium, and americium (total); cyanide; orthophosphate; SVOCs; polychlorinated biphenyls (PCBs)/pesticides; and radioactive isotopes including gross alpha, gross beta, uranium, cesium, radium, and strontium (dissolved).

yellow warblers. Mallards and other ducks often nest and rear young on several of the ponds. Killdeer and red-winged blackbirds are found in areas adjacent to the ponds. Birds of prey commonly seen in the area include marsh hawks, red-tailed hawks, ferruginous hawks, rough-legged hawks, and great horned owls (DOE 1992c). Loggerhead shrike habitat has been identified at RFP. This bird is a candidate species for the threatened and endangered species list. Bald eagle habitat has also been identified east of RFP. These threatened birds may hunt within the plant boundaries (DOE 1994). Rattlesnakes and bull snakes are the most frequently appearing reptiles. Eastern yellow-bellied racers have also been seen. The eastern short-horned lizard has been reported on the site, but these and other lizards are not commonly seen. The western painted turtle and the western plains garter snake are found in and around many of the ponds (DOE 1992c).

2.3 EXISTING MONITORING ACTIVITIES

RFP conducts routine radiological and nonradiological environmental monitoring of effluent air, ambient air, surface water, groundwater, tap water, stream sediments, and soil (Figure 1-1). Ambient air, soil, surface water, and tap water quality also are monitored at locations around RFP by CDH and by cities using surface water as municipal water supplies downstream of RFP. Municipal and CDH monitoring programs are not discussed in detail in this IM/IRA/DD.

2.3.1 Groundwater Monitoring

The current site-wide groundwater monitoring program is an amalgamation of several separate monitoring programs that address distinct regulatory-compliance or site-investigation objectives. Most of the wells at RFP were installed to fulfill site-specific data needs rather than as part of an integrated site-wide monitoring network. Wells are

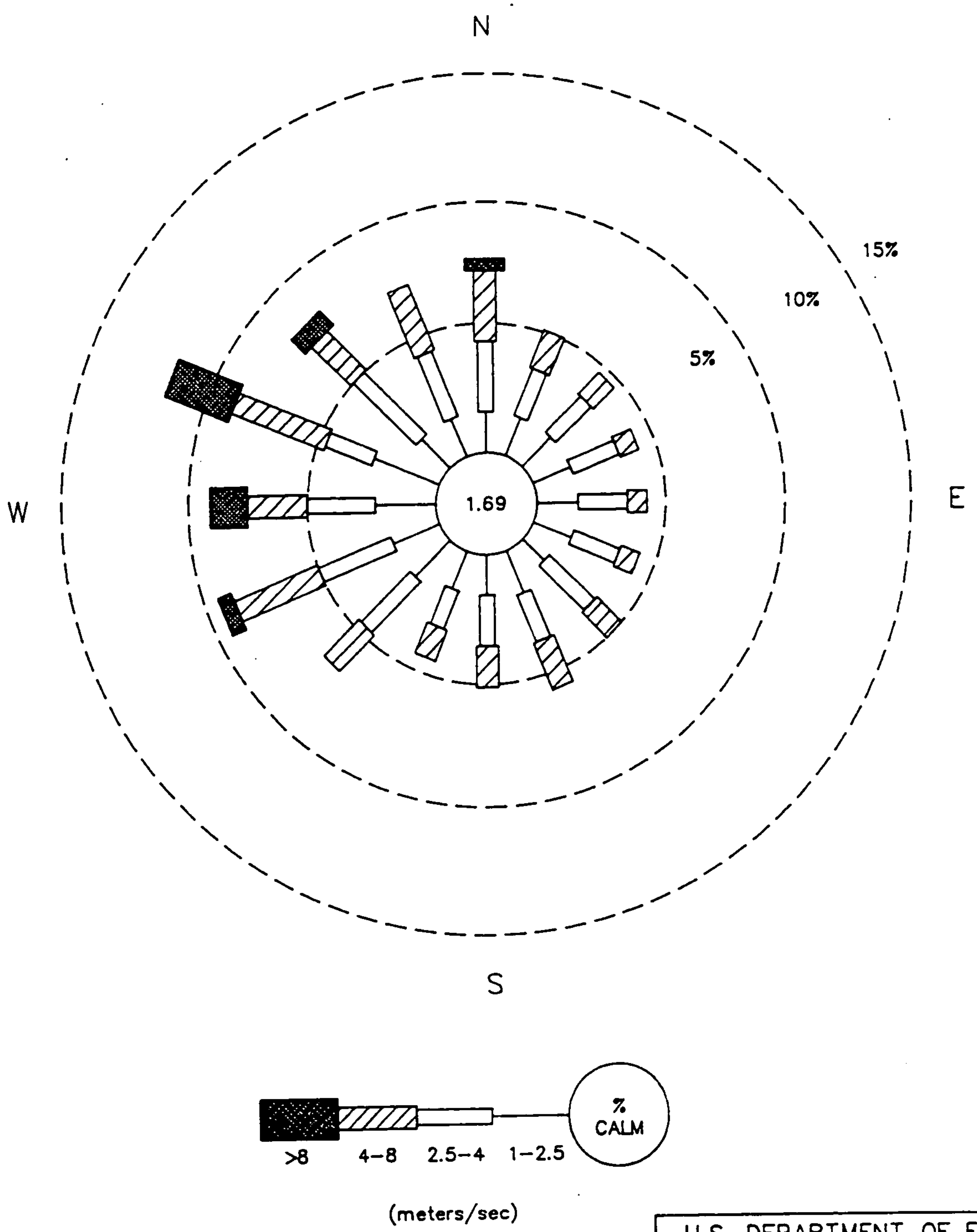
2.2.7 Ecology

A variety of plant life is found within RFP. Except for the Rock Creek drainage, the dominant vegetation found on the western portion of the site is disturbed mixed prairie, a mixture of both short and mid-length grasses. Short grasses are dominant in the eastern part of RFP and are disturbed through overgrazing. Sedges and rushes are found in stream floodplains and wet valley bottoms. Cottonwoods, shrubs, and cattails line many riparian areas.

Since acquisition of the buffer-zone property, vegetative recovery has occurred, as evidenced by the presence of disturbance-sensitive species such as big bluestem and sideoats grama. Ute Ladies'-tresses (*Spiranthes diluvialis*) has been placed on the Threatened and Endangered Species List. The habitat of this plant species has been identified in riparian areas of Colorado, specifically in meadows in the City of Boulder (Boulder County) and along Clear Creek in Jefferson County. To date, the plant has not been identified in drainages within RFP. No vegetative stresses attributable to hazardous waste contamination have been identified.

Animal populations within RFP are typical of western prairie regions. The chain-link fence surrounding the production area limits the occurrence of large mammals, such as mule deer, to the buffer zone. The permanent population of mule deer is estimated to be 100 to 125. A number of small carnivores, such as coyotes, red fox, striped skunk, and long-tailed weasel, occur onsite. Small herbivores are common throughout the plant complex and buffer zone, and include the pocket gopher, white-tailed jackrabbit, and the meadow vole (DOE 1992c). Preble's Meadow Jumping Mouse habitat has also been identified at RFP (DOE 1994).

Birds commonly observed onsite include horned larks, western meadowlarks, mourning doves, vesper sparrows, western kingbirds, black-billed magpies, American robins, and



U.S. DEPARTMENT OF ENERGY
EG&G Rocky Flats Plant, Golden, CO

FIGURE 2–13
INDUSTRIAL AREA IM/IRA/DD

Wind Rose for the Rocky Flats Plant
1992

c:\rflats\sw\swfig213.dwg 05H80300

Meteorology is influenced by local topography, regional mountain ranges, and large-scale weather systems. The orientation of the Front Range greatly affects local winds. RFP lies in a belt of prevailing northwesterly winds that are normally channeled across the eastern Rocky Flats geomorphological bench. High velocity winds have been recorded at RFP under these meteorological conditions. High winds occur most frequently in the spring.

Mean wind speed at RFP for 1990 was 9.0 miles per hour (mph). The highest reported wind speed for 1990 was 88.6 mph. Figure 2-13 illustrates the annual RFP wind frequency distribution facing true compass point directions (EG&G 1992f). The predominance of northwesterly winds and low frequency of winds greater than 15.6 mph (7 meters per second) with easterly components is typical for RFP. RFP is affected by downslope winds from Front Range canyons. Similarly, daily cycles of mountain and valley breezes occur at RFP. The general upslope air pattern condition for the Denver area is north to south with flow up the South Platte River Valley entering Front Range canyons. After sunset, air that contacts mountain surfaces cools and moves downslope, flowing in a pattern opposite of upslope movements. Downslope flows converge with the South Platte River Valley flow and move toward the north-northeast.

Strong surface air convections commonly produce thunderstorms during the summer. This activity causes severe and locally unpredictable anomalies in airflow. Late winter and spring conditions can also be influenced by Chinook windstorms. Chinooks are strong winds that move from west to east over the continental divide, often reaching 70 to 80 mph, which have been recorded in excess of 120 mph at RFP (Rockwell 1989).

2.2.6 Climate and Meteorology

Atmospheric transport of contaminants from RFP is controlled by climate, local meteorology, topography, onsite structures, and by contaminant type and concentration. Information regarding these factors is necessary to evaluate potential contaminant migration pathways from the Industrial Area.

Climate at RFP is strongly influenced by the Front Range of the Rocky Mountains. Dry, cool winters with some snow cover and warm intermittently moist summers are typical. Temperatures at RFP average a maximum of 24.4 degrees Celsius (° C) (76 degrees Fahrenheit [° F]) and a minimum of -5.56° C (22° F). Annual mean temperature is 9.78° C (49.6° F). Recorded RFP temperature extremes range from 38.89° C (102° F) in July to -32.22° C (-2° F) in January (Schleicher and Schuell 1982). Infrequent cloud cover over the region allows intense solar heating of the ground surface. The low absolute humidity permits rapid radiant cooling at night. Relative humidity averaged 46 percent from 1954 to 1976 (Rockwell 1986).

Regional topography and upper-level wind patterns combine to create a semiarid climate along the foothills of the Front Range. Average annual precipitation is approximately 15 inches, 40 percent of which falls during the spring season, much of that as wet snow. An additional 30 percent of the annual precipitation occurs as summer thunderstorms (June to August). Autumn and winter are drier, accounting for 19 and 11 percent of annual precipitation, respectively. Snowfall averages 85 inches per year, falling from October through May (DOE 1980).

Although the RFP site-specific data are limited, annual evaporation at the RFP site is estimated to be between 31 and 38 inches. This range of values is based on long-term records at Cherry Creek Dam and Fort Collins, respectively (EG&G 1991d).

Groundwater in the Laramie-Fox Hills Aquifer flows to the east or southeast in the RFP area (Hurr 1976; Robson 1983). Water levels measured in bedrock (Arapahoe and Laramie Formations) wells at RFP indicate a strong downward gradient (recharging conditions) on topographic highs (EG&G 1991b) and a slight upward gradient (discharging conditions) in stream valleys (topographic lows) (EG&G 1993a). This conclusion is based on a limited data set, however, and vertical groundwater gradients should be further investigated.

2.2.5.3 Recharge and Discharge

RFP is situated in a regional groundwater recharge area. Recharge to the upper hydrostratigraphic unit occurs as precipitation infiltrates through unconsolidated surficial materials. Most precipitation occurs in the western part of RFP, near the foothills of the Rocky Mountains. Groundwater flows laterally through the Rocky Flats Alluvium and weathered bedrock under RFP.

The Laramie-Fox Hills Aquifer is recharged primarily where bedrock crops out in the western part of RFP along the west limb of the monoclinal fold. Recharge may also occur by vertical groundwater flow from the overlying hydrostratigraphic units (Robson 1983).

Locally, there are areas of discharge as well as recharge. Seeps occur along bedrock/alluvial contacts on steep hillsides north and south of the Industrial Area. Here, groundwater may evapotranspire or may feed surface streams. As a result of extensive paving and building construction in the Industrial Area, it is estimated that less than 40 percent of the natural surface materials are exposed directly to incident precipitation (DOE 1992b). Most of the runoff is captured by trenches, culverts, and storm water drains that divert this surface water into two drainages. Baseflow of some of the perennial streams is sustained by this groundwater discharge and surface water runoff.

The Laramie-Fox Hills Aquifer is a deep, confined aquifer composed of the lower sandstone unit of the Laramie Formation and the Fox Hills Sandstone. The aquifer crops out at the west end of RFP (where it is unconfined) and dips 45 to 50 degrees to the east. Gradually, the dip decreases to less than 2 degrees beneath the central part of RFP (EG&G 1991b).

2.2.5.2 Groundwater Flow

Generally, groundwater within the upper hydrostratigraphic unit flows along the contact of the surficial alluvium with underlying Arapahoe and Laramie Formation claystones. The direction of flow is from west to east, with minor diversions along drainages and paleotopographic highs. Bedrock claystones constrain much of the flow within the upper hydrostratigraphic unit to the surficial deposits.

In the far western part of RFP, where the thickness of the Rocky Flats Alluvium is greatest, the depth to the water table is 50 to 70 feet below ground surface (bgs). The depth to water generally decreases from west to east as the surficial deposits thin. Depth to water in the Industrial Area ranged from less than 2 feet to 22 feet in April 1992, a month for which historical high water levels were recorded at RFP. In the stream drainages north and south of the Industrial Area, seeps are common at the base of the Rocky Flats Alluvium and where Arapahoe Formation sandstones are exposed (EG&G 1991b). In the Industrial Area, water levels in the upper hydrostratigraphic unit are generally lower in wells where the surficial material is directly underlain by Arapahoe Formation sandstone than in nearby wells where the surficial deposits are underlain by claystones of the Arapahoe and Laramie Formations. Rapid changes in water table elevations occur in response to short-term or incident precipitation events and variations in recharge. Water levels are highest in spring and early summer, and lowest during the winter months. Some wells are seasonally dry in the Industrial Area.

2.2.5 Hydrogeology

This section is a basic introduction to the occurrence and flow of groundwater at RFP. A conceptual model for groundwater flow in the Industrial Area is presented in detail in Section 4.0.

2.2.5.1 Definition of Hydrostratigraphic Units

The water-bearing units at RFP are commonly referred to as hydrostratigraphic units, in part because they yield insufficient water to meet the formal definition of an aquifer. An aquifer is defined as a geologic formation, group of formations, or part of a formation that is capable of yielding a significant amount of water to a well or spring (40 Code of Federal Regulations [CFR] 260.1). By definition, a hydrostratigraphic unit is composed of geologic materials with similar hydrologic properties. Three water-bearing units at RFP will be addressed: the upper hydrostratigraphic unit, the lower hydrostratigraphic unit, and the Laramie-Fox Hills Aquifer.

The upper hydrostratigraphic unit consists of several distinct lithostratigraphic units: Rocky Flats Alluvium, colluvium, valley-fill alluvium, landslide deposits, weathered Arapahoe and Laramie Formation bedrock, and all sandstone units within the Arapahoe and Laramie Formations that are in hydraulic connection with overlying unconsolidated surficial deposits or the ground surface. This unit includes the Number 1 sandstone. In places where the uppermost sandstone is separated from the surficial materials by claystones and silty claystones, it may exist as a semiconfined unit.

The unweathered Arapahoe and Laramie Formations comprise the lower hydrostratigraphic unit. The claystones and silty claystones are generally believed to act as an aquitard, inhibiting the downward groundwater movement to the Laramie-Fox Hills Aquifer.

Alluvium, subcrops or may be partly eroded by South Walnut Creek in the southeast part of OU8.

2.2.4.3 Stratigraphy and Structure

The general stratigraphy of the RFP is discussed in Section 2.2.3. Locally, the beds strike north/south and dip to the east or southeast. In the western buffer zone, sediments were folded monoclinally during the Laramide Orogeny. In the western limb of the monoclinal fold, the beds are nearly vertical to overturned. The dip of shallow bedrock flattens to less than 2 degrees to the east under the central portion of the plant (EG&G 1992c).

In addition to the dip of the bedrock, the slope of the topography and location of geologic contacts (relative to land surface) affect the flow of groundwater. Regionally, the topography at RFP slopes to the east, but significant variations in relief occur locally. Valley incision in the central portion of the facility forms east-west trending ridges and east-draining valleys. Shallow bedrock units subcrop and crop out along present stream valleys. The bedrock erosion surface (pediment) dips eastward at greater than 2 degrees and, as a result, the shallow bedrock units are truncated to the east by the erosional surface.

Minor faults and fractures in the shallow bedrock may act as conduits or barriers to groundwater flow and may be potentially significant for the occurrence and migration of contaminants. Borehole logs provide important data regarding the nature and occurrence of fractures and whether fractures are open or closed.

as the Number 1 sandstone. The Laramie Formation contains at least four separate, discontinuous but mappable sandstone units. The shallow Arapahoe Formation (Number 1) sandstone is of concern as a potential contaminant pathway because of its high hydraulic conductivity.

The Number 1 sandstone has been interpreted to be part of a fluvial sequence, deposited as meandering channel, point bar, overbank, and crevasse splay deposits (EG&G 1991b). It is fine- to medium-grained, locally conglomeratic, well sorted, subangular to subrounded, moderately friable, highly weathered, and heavily iron stained. The thickness of the subcropping sandstone unit ranges from 0.5 foot in Well 2086 (Figure 2-6) to greater than 11.5 feet in Well 3186, and up to 48 feet in the OU2 area (EG&G 1993d). Usually, the Number 1 sandstone is underlain and flanked by finer units such as siltstone or claystone, and a minimum of three fining upward sequences have been recognized in the unit.

The four other sandstone units (Numbers 2 through 5), which occur in the bedrock beneath the Number 1 sandstone, have been identified as lenticular sandstones, siltstones, and claystones that are not continuous or correlative at RFP. These units are part of the Laramie Formation (EG&G 1992c). They are thinner and more silt- and clay-rich than the Number 1 sandstone, display less lateral continuity, and do not exhibit depositional characteristics typically associated with channel sandstone (EG&G 1991b; EG&G 1992c).

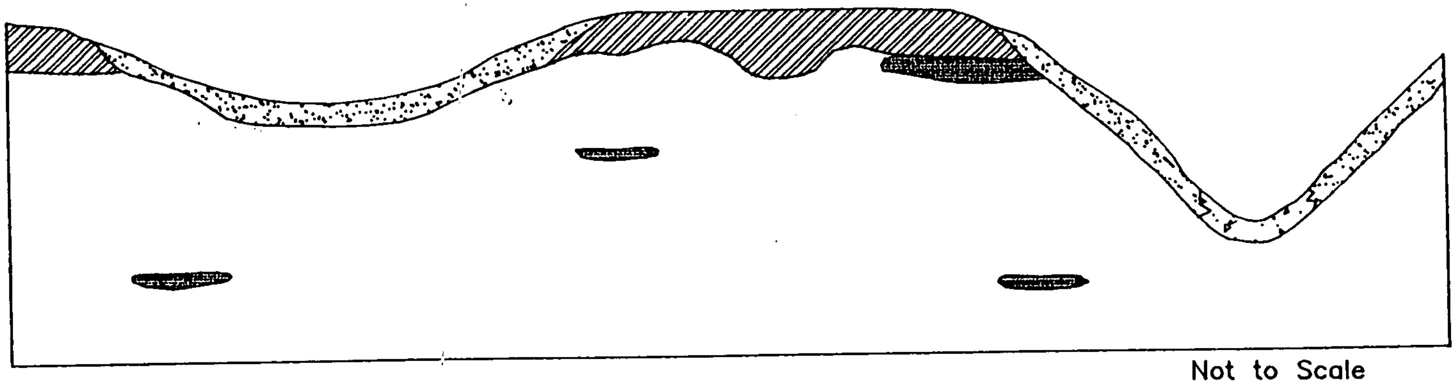
The top of the bedrock surface reflects the remnants of the pre-Wisconsin-aged pediment as well as the effects of Holocene-aged stream incisement (EG&G 1991b). Recent head-ward erosion of Rocky Flats Alluvium has exposed the underlying bedrock along North Walnut, South Walnut, and Woman creeks. Contained locally within the underlying bedrock is the Cretaceous-aged Arapahoe Formation Number 1 sandstone. This sandstone, covered by Quaternary-aged colluvium and older Quaternary-aged Rocky Flats thick. Borehole logs reveal a relatively high degree of heterogeneity within the Rocky Flats Alluvium (EG&G 1993b). In the RFP area, the alluvial material commonly consists of unconsolidated, poorly sorted, coarse gravels and sands, and gravelly clays with discontinuous lenses of clay, silt, and sand. Geologic materials native to the site (Rocky Flats Alluvium) and imported materials have been used as fill at RFP for road grade and berm construction, recontouring peripheral to structures, local valley fill, fill of topographic lows, and for construction of surface impoundments. Crushed rock has been used for landscaping and leveling at the site. Throughout most of the Industrial Area, the land surface is covered with pavement and imported gravel, in addition to buildings and disturbed ground.

Colluvial deposits are locally present on steeper slopes flanking stream drainages that extend across RFP. These undifferentiated deposits, derived from Rocky Flats Alluvium and Arapahoe Formation, were formed by slope wash, downhill creep, and landslides. Throughout the steeper slopes and valleys at the RFP, most bedrock is concealed beneath soil and draped colluvial material. Thicknesses of colluvium generally range from 0 to 20 feet (EG&G 1993b), with the thickest colluvial deposits at the base of these valley slopes. Colluvial deposits are composed of clay, clayey gravels, and gravelly clays, with lesser amounts of sand and silt. Valley-fill deposits are fluvial sediments that typically consist of clay, silt, and sand with gravel lenses. Valley-fill deposits occur along the lowland areas in and adjacent to stream beds. These deposits occur most commonly in the eastern part of RFP, and range in thickness from 0 to 25 feet (EG&G 1991b).

2.2.4.2 Bedrock Deposits

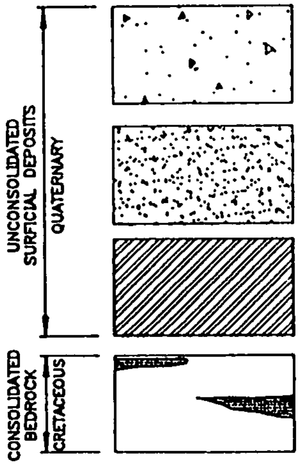
The surficial deposits unconformably overlie bedrock of the Upper Cretaceous-aged Arapahoe and Laramie Formations. Based on field mapping, the Arapahoe Formation is less than 50 feet thick in the central portion of RFP (EG&G 1992c), consisting primarily of siltstones and claystones, and containing a sandstone commonly referred to

GENERALIZED CROSS SECTION



Not to Scale

GENERALIZED LITHOLOGY



VALLEY FILL ALLUVIUM: clay, silt, and pebbly sand with silty and cobbly gravel lenses.

COLLUVIUM: clayey coarse gravel and coarse sand, slope debris derived from Rocky Flats Alluvium and outcropping bedrock. Also includes slump and landslide deposits.

ROCKY FLATS ALLUVIUM: poorly sorted, angular to subrounded cobbles, coarse gravels, coarse sands, and gravelly clay, lenses of clay, silt, and sand.

BEDROCK: claystone and siltstone, varying amounts of clay, silt, and sand, weathered intervals, sandstone lenses.

U.S. DEPARTMENT OF ENERGY
EG&G Rocky Flats Plant, Golden, CO

FIGURE 2–12
INDUSTRIAL AREA IM/IRA/DD

Generalized Cross Section and Lithologic Description Rocky Flats Plant

c:\rflats\sw\swfig212.dwg 05H60300

believed not to exist at RFP (DOE 1981). A thrust fault with a maximum throw of about 80 feet has been mapped at a depth of approximately 3,600 feet in the Pierre Shale directly beneath RFP. The thrust formed over 45 million years before present during the Laramide Orogeny and is no longer active (EG&G 1990). Other faults with larger apparent displacements have been mapped below RFP and are identified in the *Deep Seismic Report* (EG&G 1993c).

2.2.4 Site Geology

The geologic units important to the Industrial Area IM/IRA/DD for the Industrial Area are the surficial deposits and the shallow bedrock. A generalized north/south cross section of RFP is given in Figure 2-12.

2.2.4.1 Surficial Deposits

Three general types of unconsolidated surficial, Quaternary-aged deposits have been identified at RFP: (1) Pleistocene-aged alluvium, (2) Holocene-aged colluvium, and (3) valley-fill alluvium. Slump or landslide deposits, derived from unconsolidated surficial deposits and bedrock, also commonly occur on valley slopes in the steep, central part of RFP. For the purpose of this report, slump and landslide deposits are grouped with colluvium (Figure 2-12).

Pleistocene-aged deposits consist primarily of Rocky Flats Alluvium, which is the most prominent unconsolidated surficial deposit at RFP. Based on mapping compiled by Hurr (1976) and EG&G (1992e), the Rocky Flats Alluvium underlies most of the Industrial Area at RFP, provided it has not been removed and replaced with artificial fill materials. In this area, thickness of the alluvium ranges up to 50 feet, or the alluvium is absent where it has been removed by erosion and downcutting by tributaries of Walnut and Woman creeks. In the central portion of RFP, the deposit is approximately 15 to 25 feet

- Verdos Alluvium. The Verdos Alluvium is similar in structure and texture to the Rocky Flats Alluvium, but contains a much more diverse suite of deposits. Whereas the Rocky Flats Alluvium occurs primarily as a large alluvial fan extending eastward from Coal Creek Canyon, the Verdos alluvial surfaces are composed of alluvial fan deposits, stream terrace deposits, and smaller pediment deposits flanking the Rocky Flats surface. Alluvial terrace deposits have been mapped south and west of the RFP Industrial Area.

2.2.3.3 Regional Structure and Tectonics

Structurally, RFP is located along the western margin of the Denver Basin about 4 miles to the east of the Front Range uplift. The Front Range is the most easterly range of mountains in the Southern Rocky Mountain physiographic province. The current Rocky Mountains formed during the Laramide Orogeny, which occurred 67.5 to 45 million years ago. The Laramide Orogeny is believed to have begun as a broad, gentle uplift that caused the regression of the Cretaceous sea from the area (Lovering 1929; Reichart 1953). The orogeny continued with continental margin sedimentation and volcanism, and culminated with rapid uplift and erosion, exposing the Precambrian-aged crystalline core of the Front Range.

The Denver Basin extends eastward from the eastern border of the Front Range into western Nebraska and northwestern Kansas. The basin is an asymmetrical down warp with a steeply dipping west flank and a broad, gently dipping eastern flank. The basin contains more than 13,000 feet of Paleozoic, Mesozoic, and Cenozoic sedimentary rocks (described in Section 2.2.3.1) overlying a Precambrian basement.

No active faults are known to exist along the Front Range in the area from Golden to Boulder, Colorado. The Eggleston Fault, which was mapped by Spencer (1961) and later projected onto RFP (Hurr 1976), was investigated in great detail in 1981 and is now and relative stability. Deposits of alluvium, colluvium, landslide materials, and artificial fill form an extensive sedimentary cover throughout RFP. The most comprehensive mapping of Quaternary-aged alluvial surfaces in this area was conducted by Scott (1961; 1962; 1963). Eight Quaternary-aged alluvial deposits, each associated with a separate period of deposition, are recognized in the Front Range area. The oldest of these deposits are described below:

- Pre-Rocky Flats Alluvium. The pre-Rocky Flats Alluvium is the oldest Quaternary-aged deposit in the area and occurs as two small isolated, gravel-capped remnants in the vicinity of the Coal Creek drainage. This alluvial deposit consists of medium brown, poorly sorted, angular to well-rounded, bouldery and sandy gravel.

- Rocky Flats Alluvium. The Rocky Flats Alluvium forms an extensive fan emanating from the mouth of Coal Creek Canyon, 3 miles west of RFP. The alluvium is thickest west of RFP, near Coal Creek Canyon, and thinnest east of the Industrial Area, near the depositional limit of the alluvial fans. Deposits of smaller areal extent occur in the Golden Quadrangle to the south and other very small, isolated patches of Rocky Flats Alluvium occur elsewhere. The upper surface of the Rocky Flats Alluvium in the vicinity of RFP forms a gently eastward-sloping surface that is dissected by numerous eastward-flowing streams. The alluvium consists of medium to dark red-brown, poorly to moderately sorted, poorly stratified, silty, sandy, and bouldery gravel, derived predominantly from the Coal Creek quartzite to the west. Exposures of the alluvium indicate that the deposit is generally on the order of 40 to 50 feet (12 to 15 meters) thick, but is reported to be as thick as 90 to 100 feet (27 to 30 meters) in buried channels (Ackerman 1974; de Oliviera 1975). The age of the Rocky Flats Alluvium is estimated to be 1,000,000 to 2,000,000 years old (Scott 1960).

distinguish from the overlying Laramie Formation. The basal Fox Hills Formation interfingers with the Pierre Shale, and often contains more than 50 percent shale.

- Laramie Formation (late Cretaceous). The Laramie Formation consists of interbedded light to medium gray-brown quartzose sandstone, shale, claystone, and coal beds. It is divided into two intervals: a lower unit (about 300 feet thick) of sandstone, siltstone, and claystone with coal layers; and an upper claystone unit (Weimer 1973; EG&G 1991c). The coal and clay seams within the lower 200 feet (60 meters) of the formation have been extensively mined along the Front Range. Basal Laramie Formation sandstones are fine- to coarse-grained, poorly sorted, subangular, and silty, and form prominent hogbacks west of RFP.

  The upper interval of the Laramie Formation, about 500 feet thick at RFP, consists of light to medium gray, kaolinitic claystone with some dark gray to black carbonaceous claystone (EG&G 1991b).

- Arapahoe Formation (late Cretaceous). The Arapahoe Formation is an interbedded sequence of brown and gray quartzose sandstone, siltstone, and claystone. Beds are commonly discontinuous. The base of the formation is commonly marked by a conglomeratic unit. Currently, the contact between the Arapahoe and Laramie Formations is not clearly defined at RFP. Most of the Arapahoe and Upper Laramie Formation sandstones are very fine- to medium-grained, poorly to moderately sorted, subangular to subrounded, silty, and clayey. An upper coarse-grained conglomeratic sandstone has also been identified.

2.2.3.2 Quaternary Stratigraphy

The Quaternary-aged sequence of sedimentary deposits along the Front Range presents a detailed record of the climatically influenced cyclic processes of erosion, deposition,

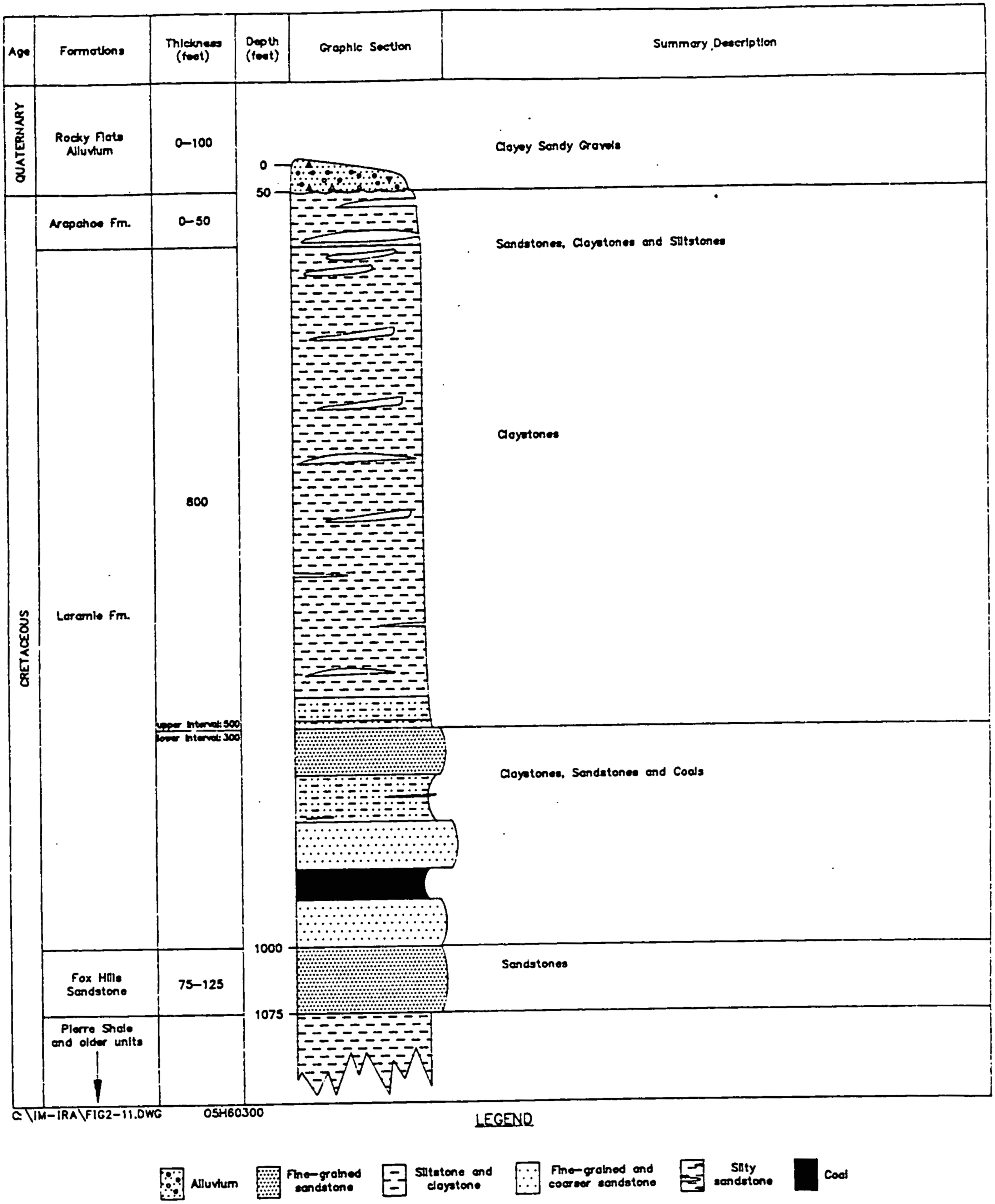
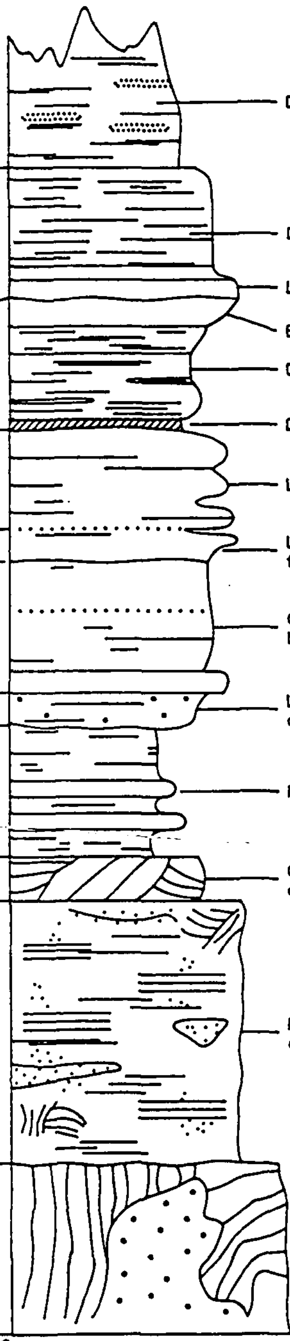


FIGURE 2-11
Industrial Area IM/IRA/DD
Generalized Stratigraphic Section
Rocky Flats Plant

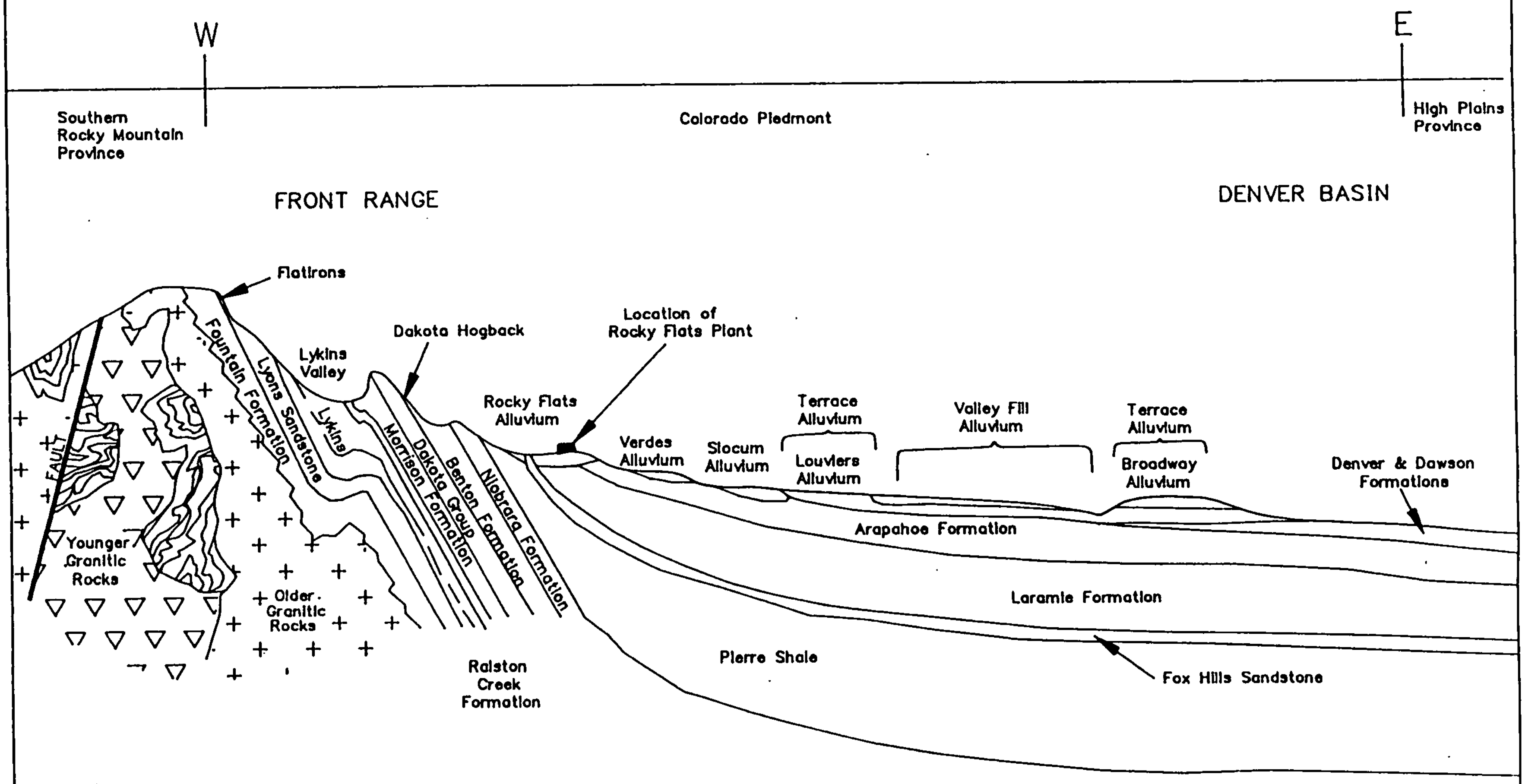
Age	Formations	Thickness (feet)	Summary Description
TERTIARY			
TERTIARY	Green Mt. Conglomerate	600	Boulder conglomerate with occasional thin siltstone lenses
TERTIARY	Denver – Arapahoe Fm.	1200	Tan sandy claystone and clayey sandstone, conglomerate at base, includes *Table Mountain andesite to the north*
UPPER CETACEOUS	Laramie Fm.	1000	Gray, fine– to medium–grained sandstone & silty claystone, thin coal beds at bottom
UPPER CETACEOUS	Fox Hills Fm.	75	Tan, fine– to medium–grained sandstone and sandy shale
UPPER CETACEOUS	Pierre Fm.	8000	Dark gray, silty shale and fine silty sandstone
UPPER CETACEOUS	Niobrara Fm.	350	Dark gray very calcareous shale. Foraminifera abundant (Smoky Hill Member) Light gray, dense, fossiliferous limestone (Fort Hays Member)
UPPER CETACEOUS	Benton Fm.	420	Brown sandy fossiliferous limestone Dark gray shale with bentonite streaks, thin limestone in middle part Dark gray, brittle silty shale (Mowry)
LOWER CRETACEOUS	Dakota Group: South Platte Fm.	270	Light gray fine– to medium–grained sandstone, several dark gray shales in middle
LOWER CRETACEOUS	Dakota Group: Lytle Fm.	100	Light gray, fine– to coarse–grained, locally conglomeratic sandstone, frequent red and green siltstone interbeds
JURASSIC	Morrison Fm.	365	Gray to greenish–gray to red shale and sandstone, thin limestones in middle part, lenticular sandstones in upper and lower part
JURASSIC	Ralston Creek Fm.	110	Light tan siltstone and light red, silty shale. Gypsiferous sandstone at base and locally conglomeratic.
TRIASSIC?	Lykins Fm.	400	Red siltstone with two laminated limestones in lower part
PERMIAN	Lyons Fm.	120	Grayish white, fine– to medium–grained, cross–bedded sandstone, conglomeratic lenses frequent
PENNSYLVANIAN	Fountain Fm.	1000	Red, fine– to coarse–grained sandstones and conglomerates, arkosic, thin, lenticular red siltstones frequent throughout
PRECAMBRIAN			Gneiss, schist and small granitic inclusions Exposed at mouth of Mt. Vernon Canyon



Modified from LeRoy & Weimer 1971; Weimer 1973

C:\IM-IRA\FIG2-9.DWG 05H60300

FIGURE 2-9
Industrial Area IM/IRA/DD
Generalized Stratigraphic Section, Golden–Morrison Area
Rocky Flats Plant



Not To Scale

(Based on EG&G 1992d)

(After: Boulder County Planning Commission 1983 and Scott 1960)

U.S. DEPARTMENT OF ENERGY
EG&G Rocky Flats Plant, Golden, CO

FIGURE 2-10
INDUSTRIAL AREA IM/IRA/DD

Generalized East-West
Cross Section
Front Range to Denver Basin

c:\rflats\tc\swfig211.dwg 05H60300

The geologic media in the vicinity of RFP can be grouped into two general categories: (1) consolidated bedrock and (2) overlying unconsolidated surficial deposits. The structural and tectonic features of the region are important because of their effects on the occurrence and flow of groundwater and surface water.

2.2.3.1 Bedrock Stratigraphy

The rocks in the region range in age from Precambrian to Holocene. Precambrian-aged gneiss, schist, and quartzite form the core of the Front Range and are found at a depth of about 12,000 feet (3,700 meters) below RFP. A laterally extensive sequence of Paleozoic-, Mesozoic- and Cenozoic-aged sedimentary rocks unconformably overlie the Precambrian-aged basement rocks. The contact between the basement rocks and the overlying sedimentary strata dips steeply eastward toward the Denver Basin (DOE 1981). The Upper Cretaceous-aged strata dip steeply to the east along the western limb of an asymmetrical north-south trending syncline (western edge of the Denver Basin). These strata are nearly flat-lying to gently east-dipping beneath RFP.

The sedimentary section is approximately 12,000 to 13,000 feet thick and consists of fluvial, deltaic, and marine strata. A generalized stratigraphic column of the Golden-Morrison area (a few miles south of RFP) and a generalized cross section from the Front Range to the Denver Basin are presented in Figures 2-9 and 2-10. The upper bedrock formations pertinent to RFP are shown in a generalized stratigraphic column (Figure 2-11) and are described below:

- Fox Hills Formation (late Cretaceous). The Fox Hills Formation is a light brown to brown-orange, silty, fine- to medium-grained sandstone with interbedded sandy shale. The formation is slightly calcareous and characteristically contains iron concretions. The upper Fox Hills Formation sandstone may be difficult to

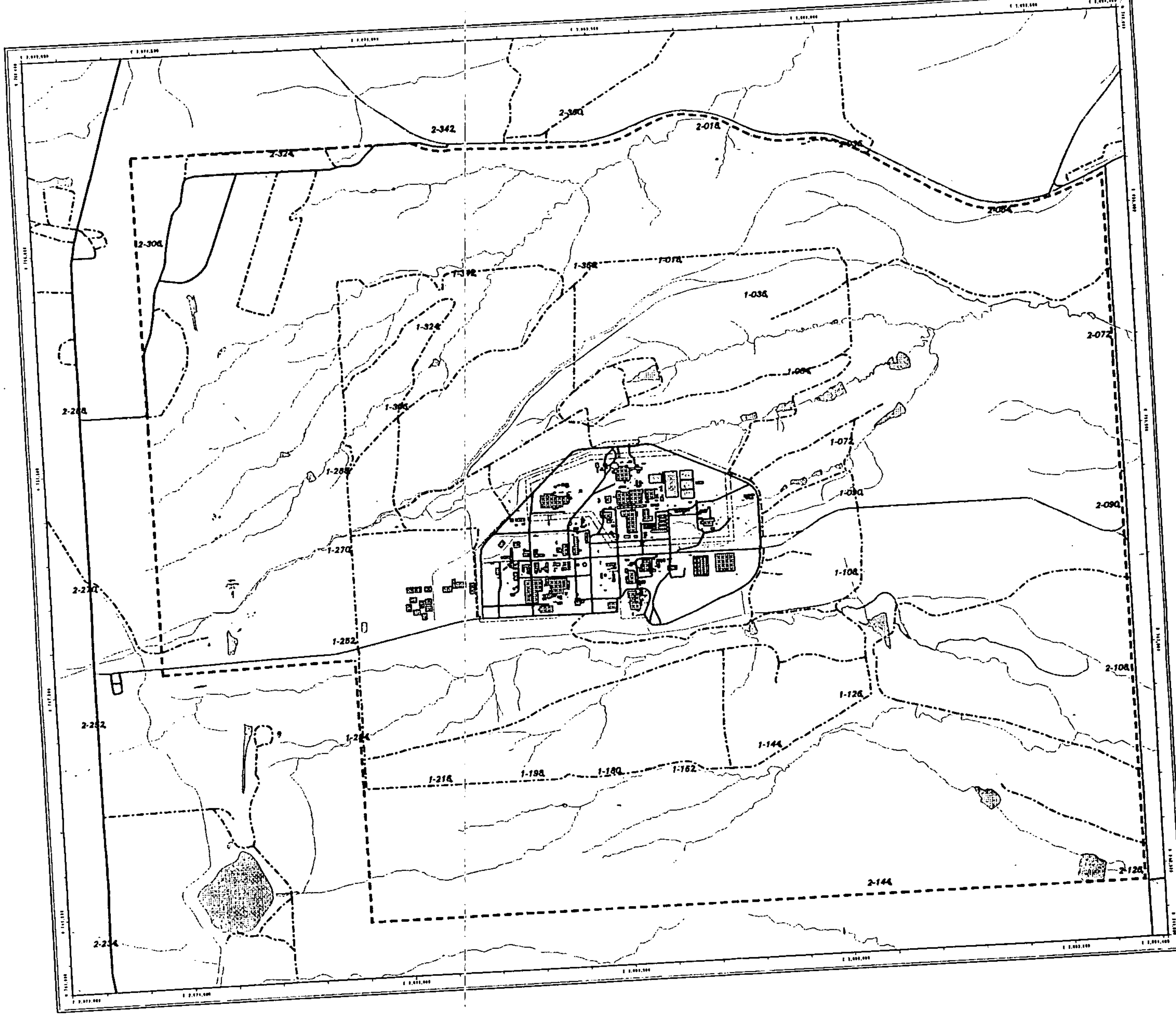
Eight other ditches convey water throughout the general RFP area: South Boulder Diversion Canal, Last Chance Ditch, Upper Church Ditch, McKay Ditch Bypass, Smart Ditch, Smart 2 Ditch, Mower Ditch, and Kinnear Ditch. The Upper Church Ditch, McKay Ditch Bypass, Kinnear Ditch, and Last Chance Ditch all divert water from Coal Creek to the east; the Smart Ditch diverts water from Rocky Flats Lake to the east; the Smart 2 Ditch diverts water from the Smart Ditch to a Woman Creek tributary; and the Mower Ditch diverts water from Woman Creek into Mower Reservoir. The South Boulder Diversion Canal is located west of RFP and is unlined in the vicinity of RFP, except for a cement-lined 100-meter aqueduct that crosses the Woman Creek drainage. Other ditches around RFP are unlined and tend to lose water through seepage into the underlying subsurface materials.

In addition to the ditches described above, other surface-water management controls are also in operation at RFP. The West Interceptor Canal diverts runoff from the headwaters of North Walnut Creek via the McKay Ditch Bypass to Walnut Creek west of Indiana Street. In addition to ditches and canals, a series of detention ponds have been constructed to control the release of the RFP discharges and to collect surface runoff.

2.2.3 Regional Geology

A conceptual understanding of geology and hydrology is necessary to the evaluation of contaminant migration and monitoring of groundwater and surface water pathways. Information that has contributed to this understanding includes the *Geologic and Seismologic Investigations for Rocky Flats Plant* (DOE 1981), *Rocky Flats Plant Phase I Geologic Characterization Report* (EG&G 1991b), the *Phase II Geologic Characterization - Data Acquisition Surface Geologic Mapping of the Rocky Flats Plant and Vicinity* (EG&G 1992c), the *Well Evaluation Report* (EG&G 1993b), and the *Background Geochemical Characterization Report* (EG&G 1992d).

FIGURE 2-14
Industrial Area IM/IRA/DD Annual Soil Sampling Stations



U.S. Department of Energy
Rocky Flats Plant

Prepared by:
EG&G ROCKY FLATS
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

MAP ID: annual-ss

November 15, 1994

(intentionally blank)

upper 5 centimeters (cm) of the soil horizon by water, liquid contaminant, or other means. It should be noted that the OU2 sampling also incorporated a thorough sampling of the upper 1.0 meter of the soil horizon using soil pits and trenches at selected sample plots. This sampling has provided valuable information regarding the movement of radionuclides in the vadose zone that can be applied as a model elsewhere at the plant, but would be impractical as a routine monitoring tool.

In September 1991, an extensive soil sampling program was undertaken in support of the ongoing investigations at the 903 Pad, East Trenches, and 881 Hillside. Composite samples were collected from eighty-four 10-acre plots and thirty-four 2.5-acre plots located in the southeast quadrant of the Industrial Area and east to Indiana Street. An additional 11 samples were collected from each of 26 soil profiles, excavated to a depth of 1.0 meter. Instrumentation was installed at five excavation sites immediately adjacent to the southeastern boundary of the Industrial Area, and water movement in the vadose zone is monitored continuously at these sites. In addition, samples of the interstitial water are periodically acquired and analyzed for total, dissolved, and colloidal plutonium and americium, in addition to a suite of physical parameters.

Soil sampling is very well-suited to characterizing contaminated sites, less well-suited for long-term monitoring, and unsuitable for short-term monitoring programs. Although soil is frequently the first environmental medium to receive contaminants during a release (particularly liquid contaminants), it is the least likely to act as a transport medium. In general, contaminants in soil are more likely to be remobilized by volatilization (to air), dissolution (to groundwater or surface water), suspension in water (to storm water runoff or to groundwater or surface water as colloidal material), or airborne transport (as a result of moderate or high wind activity). Soils may be susceptible to transport by even low-energy wind activity if soil has been disturbed.

Soils are less conducive to monitoring programs because when a soil location has been sampled and disturbed, an adjacent (or nearby) location must be used the next time, introducing an unavoidable sampling bias. This problem can largely be reduced by taking composite samples over large areas (as was done recently in OU2 using the CDH method), but the effects of the inhomogeneity of contaminants in a soil medium and disturbance of an area during repeated sampling cannot be totally overcome. Generally at RFP, the objective of a soil monitoring program is to track radionuclide contamination at the air-soil interface to monitor for net losses or gains as a result of remobilization or deposition by wind.

Because of the nature of soil contamination (i.e., a contaminated medium, not a transport medium), most long-term monitoring has been focused on transport media (air, surface water, and groundwater). However, considerable soil and surface water sediment sampling in support of OU characterization activities has occurred recently (EG&G 1993d). As of December 1992, several programs were completed, planned, or in progress, including (1) OU1 - 881 Hillside (280 soil samples, 85 sediment samples), (2) OU2 - 903 Pad, Mound, East Trenches (48 boreholes, 625 soil samples, five soil trenches, 20 soil pits), (3) OU3 - Offsite (250 soil samples, 230 sediment samples), (4) OU4 - Solar Ponds (soil sampling in two boreholes), (5) OU5 - Woman Creek (eight soil borings, unspecified number of sediment samples), (6) OU6 - Walnut Creek (48 soil borings sampled [of 105 proposed], 50 pond sediment samples), (7) OU7 - Present Landfill (250 soil samples, soil sampling continuing), (8) OU9 - OPWL (soil borings, test pits planned), and (9) OU13 - 100 Area (comprehensive surficial soil sampling planned).

The current site-wide programs to monitor potential soil transport media, combined with the annual soil monitoring program in the buffer zone, are adequate at this time to monitor any remobilization of plutonium- and americium-contaminated soils. Soil sampling and monitoring programs specific to the individual OUs will provide a detailed characterization of contamination at individual sites.

2.3.5 Foundation Drains and Incidental Waters

Nineteen foundation drains and building sumps are sampled quarterly and analyzed for pH, conductivity, radionuclides, total dissolved solids (TDS), and nitrate. The majority of the foundation drains discharge directly into storm drains or surface water drainages. These foundation waters are managed under the surface water program.

Incidental waters that collect on the ground surface, on drums, around tanks, and in berms and excavations are collected and sent to the process waste treatment facility in Building 374. These waters are managed under the control and disposition of incidental waters program and are discussed further in Section 7.3.

2.4 MONITORING FOR DECONTAMINATION AND DECOMMISSIONING ACTIVITIES

Currently, D&D activities are not well defined but involve the removal of fixed materials ~~(including residual constituents of concern), equipment, and facilities, including~~ buildings. Potential activities include the following:

- Remove fixed equipment, piping, and tanks.
- Retrofit equipment for future use.
- Dismantle and remove ventilation systems including glove boxes, ducts, and stacks.
- Modify or renovate buildings.
- Dismantle or demolish buildings.
- Perform building construction.
- Excavate underground equipment, piping, and foundations.
- Excavate UBC.

Environmental and worker safety monitoring for D&D activities will consider the following: (1) facility characterization performed during transition; (2) COPCs for the facility or activity; (3) COPC sources; (4) engineering controls to prevent releases; and (5) levels of COPC detection that require a response, including emergency response. Section 9.0 describes potential D&D activities, an approach for developing a COPC list, preprogrammed responses for verification monitoring, and emergency response planning for D&D activities.

2.5 REFERENCES

Ackerman, H.D. 1974. Shallow seismic compressional and shear wave refraction and electrical resistivity investigations at Rocky Flats, Jefferson County, Colorado: *U.S. Geological Survey Journal of Research*, v. 2.

Boulder County Planning Commission. 1983. *Boulder County Comprehensive Plan-Geology Element*. Boulder County Land Use Department.

de Oliviera, R.B.B. 1975. Exploration for buried channels by shallow seismic refraction and resistivity and determination of elastic properties at Rocky Flats, Jefferson County, Colorado: Golden, Colorado School of Mines, unpublished M.S. thesis T-1718.

EG&G Rocky Flats, Inc. 1993a (April). *Non-Storm Water Discharge Locations and Sampling at Rocky Flats*. Environmental Protection Management, Surface Water Division. SUD-010-93.

EG&G Rocky Flats, Inc. 1993b (November 12). *Well Evaluation Report*. Draft Final.

EG&G Rocky Flats, Inc. 1993c. *Deep Seismic Report*.

EG&G Rocky Flats, Inc. 1993d. *Rocky Flats Plant Site Environmental Report, January through December 1992*.

EG&G Rocky Flats, Inc. 1993e (November). M. Litaor of EG&G Rocky Flats, Inc. Personal communication with Dan Schultz of Jacobs Engineering Group Inc.

EG&G Rocky Flats, Inc. 1992a (October 1). *Rocky Flats Plant Mission Transition Program Management Plan.*

EG&G Rocky Flats, Inc. 1992b. *Environmental Monitoring Plan*. Final.

EG&G Rocky Flats, Inc. 1992c (March). *Phase II Geologic Characterization - Data Acquisition Surface Geologic Mapping of the Rocky Flats Plant and Vicinity, Jefferson and Boulder Counties, Colorado.* Final Report.

EG&G Rocky Flats, Inc. 1992d (September 30). *Background Geochemical Characterization Report, Rocky Flats Plant.* Final. Golden, Colorado.

EG&G Rocky Flats, Inc. 1992e. *Operating Procedures, Vol. II, Groundwater.* No. 521000, SOPS-GW. Environmental Management Department.

EG&G Rocky Flats, Inc. 1992f. *Rocky Flats Plant Site Environmental Report for 1990.* RFP-ENV-90.

EG&G Rocky Flats, Inc. 1991a. *Rocky Flats Plant Site Environmental Monitoring Report, January through December 1991.* RFP-ENV-91.

EG&G Rocky Flats, Inc. 1991b (July 31). *Rocky Flats Plant Phase I Geologic Characterization Report.*

EG&G Rocky Flats, Inc. 1991c (November 27). *Final Groundwater Protection and Monitoring Program Plan for Rocky Flats Plant,* in compliance with DOE Order 5400.1.

EG&G Rocky Flats, Inc. 1991d (September 30). *Sanitary Sewer Infiltration/Inflow and Exfiltration Study*. Rocky Flats Plant Site, Task 1 of the Zero-Offsite Water-Discharge Study. Prepared by Advanced Sciences, Inc.

EG&G Rocky Flats, Inc. 1990 (January 3). *Geologic Characterization Report*. Draft.

Hurr, R.T. 1976 (March). *Hydrology of Nuclear-Processing Plant Site, Rocky Flats, Jefferson County, Colorado*. Open File Report 76-268. USGS, Denver, Colorado.

LeRoy, L.W. and R.J. Weimer. 1971. "Geology of the Interstate 70 Roadcut, Jefferson County, Colorado." Colorado School of Mines Prof. Contribution No. 7.

Lovering, T.S. 1929. Geologic History of the Front Range, Colorado: Colorado Scientific Society Proceedings, v. 12.

Reichart, S.O. 1953. Geology of the Golden-Green Mountain area, Jefferson County, Colorado: Colorado School of Mines, Ph.D. thesis.

Robson, S.G. 1983. *Hydraulic Characteristic of the Principal Bedrock Aquifers in the Denver Basin, Colorado*: U.S. Geological Survey Hydrologic Investigations Atlas HA-659, scale 1:500,000, three sheets.

Rockwell International. 1989. *RCRA Closure Plan Tanks T-40, T-66, T-67, T-68, Hazardous Waste Management Unit.*

Rockwell International. 1986. *Annual Environmental Monitoring Report, January-December 1985*. Golden, Colorado: Rockwell International, Rocky Flats Plant, Report RFP-ENV-85, 1986.

Schleicher and Schuell. 1982 (March). Publication No. 500, "Innovative Products for Separation Science."

Scott, G.R. 1963. "Quaternary Geology and Geomorphic History of the Kassler Quadrangle, Colorado," U.S. Geological Survey Professional Paper 421-A.

Scott, G.R. 1962. Geology of the Littleton quadrangle, Jefferson, Douglas, and Arapahoe Counties, Colorado: U.S. Geological Survey Bulletin 1121-LO.

Scott, G.R. 1961. Preliminary geologic map of the Indian Hills quadrangle, Jefferson County, Colorado: U.S. Geological Survey Miscellaneous Geological Investigations Map I-333, scale 1:24,000.

Scott, G.R. 1960. "Quaternary Sequence East of the Front Range Near Denver, Colorado," U.S. Geological Survey Professional Paper 700-C.

Spencer, F.D. 1961. "Bedrock Geology of the Louisville Quadrangle, Colorado," U.S. Geological Survey Geologic Quadrangle Map GQ-151.

U.S. Department of Energy. 1994. Memorandum and Attachments from Gail S. Hill to Regina Sarter.

U.S. Department of Energy. 1992a (July). *Rocky Flats Transition Plan, Report to Congress.*

U.S. Department of Energy. 1992b (December). *Final Phase I RFI/RI Work Plan, Rocky Flats Plant, 700 Area, Operable Unit No. 8.*

U.S. Department of Energy. 1992c (September). *The Baseline Biological Characterization of the Terrestrial and Aquatic Habitats at the Rocky Flats Plant.* Final Report.

U.S. Department of Energy. 1990. *1989 Population, Economic and Land Use Data Base for Rocky Flats Plant, Golden, Colorado.*

U.S. Department of Energy. 1987 (December 15). RCRA Part B Operating Permit Application for U.S. DOE-Rocky Flats Plant, Hazardous and Radioactive Mixed Wastes. CO7890010526, Revision 1.

U.S. Department of Energy. 1981. *Geologic and Seismologic Investigations for Rocky Flats Plant.* Contract DE-AC04-80A110890.

U.S. Department of Energy. 1980. *Final Environmental Impact Statement: Rocky Flats Plant Site, Golden, Jefferson County, Colorado.* Volumes 1, 2, and 3, Washington, D.C., DOE/EIS-0064.

Weimer, R.J. 1973 (July). "A Guide to Uppermost Cretaceous Stratigraphy, Central Front Range, Colorado: Deltaic Sedimentation, Growth Faulting, and Early Laramide Crustal Movement," *The Mountain Geologist*. Volume 10.

(intentionally blank)

Section 3.0

3.0 CONSTITUENTS OF POTENTIAL CONCERN, COMPOUNDS OF INTEREST, AND SOURCES

An evaluation was conducted to identify a preliminary list of potential constituents and/or compounds that may require environmental monitoring in surface water and sediment, groundwater, or air. These materials are designated as either COPCs or COIs based on past or potential releases. Source area locations for compounds, including waste streams, and constituents were also identified for further refinement of media- and pathway-specific environmental monitoring requirements.

3.1 APPROACH

Chemical compounds stored, used, or spilled in the Industrial Area were evaluated to identify COPCs and COIs for environmental monitoring. Constituents that were accidentally released to the environment or disposed of improperly by former management practices are considered COPCs. Chemical compounds or wastes that could be spilled in future accidental releases to the environment (unplanned events) are considered COIs. COIs were delineated from chemical product inventories and tracking of process wastes that are currently stored in buildings. These were identified as the most important chemicals to address in the evaluation of current environmental monitoring systems. Figure 3-1 shows the general approach to identifying COPCs and COIs. This approach and the information resources used are discussed in the following subsections.

3.1.1 Constituents Associated with Historical Releases

Information about constituents associated with historical releases has been identified under the CERCLA/RCRA program of the IAG. IHSSs located in the designated

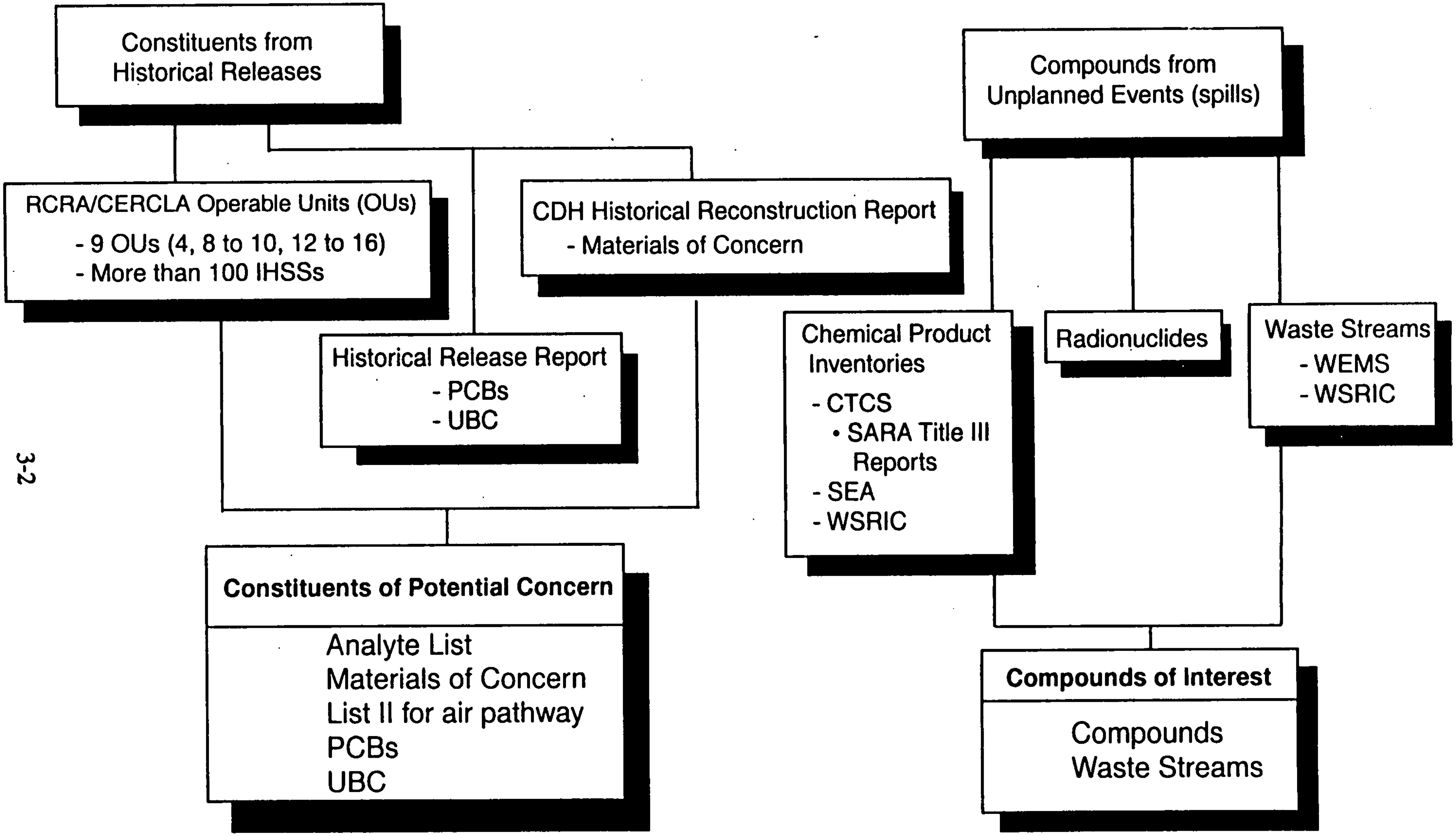


FIGURE 3-1
Industrial Area IM/IRA/DD
Constituents of Potential Concern and Compounds of Interest

h:\wp\flats\graphics/contam. fh3 8/4/94

CERCLA/RCRA OUs are included as part of the IAG. The following portions of nine OUs are in the Industrial Area:

- OU4 - Solar Ponds;
- OU8 - 700 Area;
- OU9 - Original Process Waste Lines (OPWL);
- OU10 - Other Outside Closures;
- OU12 - 400/800 Area;
- OU13 - 100 Area;
- OU14 - Radiological Sites;
- OU15 - Inside Building Closures; and
- OU16 - Low Priority Sites.

A list of hazardous substances identified in the IAG was supplemented with other constituents that were identified from information in the *Draft Integrated Field Sampling Plan for OUs 8, 9, 10, 12, 13, and 14* (EG&G 1993a), the *Historical Release Report* (HRR) (EG&G 1992a) and the quarterly updates to the HRR, the *Plan for Prevention of Contaminant Dispersion* (DOE 1991a), the *Reconstruction of Historical Rocky Flats Operations and Identification of Release Points, Project Tasks 3 & 4* report (CDH 1992), and data from other technical documents, to form an initial set of COPCs. These documents were also used to identify approximate locations of contaminant releases for subsequent source evaluation. Details on the documents that were reviewed are presented in Section 3.2.

Historical releases of PCBs and historical releases resulting in potential UBC were also evaluated. Thirty-five PCB sites were identified in the *Assessment of Known, Suspect and Potential Environmental Releases of PCBs, Preliminary Assessment/Site Description* (EG&G 1991a) and the *Historical Release Report* (EG&G 1992a). These locations will be specifically monitored for PCBs. The *Historical Release Report* (EG&G 1992a) also identified locations of potential UBC.

3.1.2 Chemical Product Inventories

Chemicals with the potential to be released, COIs, were identified from examination of building-specific chemical product inventories. Chemical inventories for each building in the Industrial Area were obtained from EG&G personnel in the Chemical Tracking and Control System (CTCS) group. This group is responsible for meeting the reporting requirements under the Superfund Amendments and Reauthorization Act (SARA) Title III Emergency Planning and Community Right-to-Know Act (EPCRA). Additional information was obtained from the *Fiscal Year 93 Systems Engineering Analysis Facility Characterization and Inventory Report* (EG&G 1993b) and the Waste Stream Residue Identification and Characterization (WSRIC) Database (EG&G 1993c). The databases of chemical inventories and a list of the COIs are discussed further in Section 3.2.

3.1.3 Chemical Waste Streams and Waste Storage

Additional COIs were identified from evaluation of information related to chemical waste streams and waste storage. EG&G personnel who maintain data on waste streams and waste storage were contacted for a list of chemical wastes that are located in each building's permitted storage areas (PSA) within the Industrial Area. This list was compiled from the Waste and Environmental Management System (WEMS) Database (EG&G 1993d) and WSRIC Database (EG&G 1993c).

Locations of RCRA-permitted waste storage areas, where large amounts of hazardous wastes could be stored, were identified for geographical-specific evaluation of environmental monitoring systems. These databases, locations of RCRA-permitted storage areas, and the COIs are described in Section 3.2.

3.1.4 Radionuclides

Radionuclides and radionuclide waste streams were also evaluated. The list of radionuclide COIs includes all radionuclides and special nuclear material (SNM) that could potentially be stored in buildings in the Industrial Area and that could be released through an unplanned event or accidental spill. Radionuclides are discussed in Section 3.2.2.3.

3.2 DESCRIPTION OF DATA REVIEWED

The primary documents and databases that were used to identify COPCs and COIs include the following:

- Interagency Agreement (DOE et al. 1991b);
- *Plan for the Prevention of Contaminant Dispersion* (DOE 1991a);
- *Reconstruction of Historical Rocky Flats Operations & Identification of Release Points, Project Tasks 3 & 4* (CDH 1992);
- *Draft Integrated Field Sampling Plan for OUs 8, 9, 10, 12, 13, and 14* (EG&G 1993a);
- Draft *Environmental Restoration Technical Support Document* (ERTSD) (EG&G 1992b);
- *Historical Release Report* (EG&G 1992a) and quarterly updates;

- Rocky Flats Plant Chemical Tracking and Control Inventory Database (EG&G 1993e);

- *Fiscal Year 93 Systems Engineering Analysis Facility Characterization and Inventory Report* (EG&G 1993b);

- RFP Waste and Environmental Management System (WEMS) Database (EG&G 1993d); and

- RFP Waste Stream and Residue Identification and Characterization (WSRIC) Database (EG&G 1993c).

3.2.1 Constituents of Potential Concern and Sources

As discussed previously, COPCs are those constituents that were released to the environment from historical spills or past waste management practices. The COPCs were compiled from data in RFI/RI planning documents, the *Reconstruction of Historical Rocky Flats Operations & Identification of Release Points* (CDH 1992) and the *Historical Release Report* (EG&G 1992a).

3.2.1.1 Analyte List

The IAG contains a hazardous substance list for IHSSs included under the RFI/RI at RFP. This initial list has been replaced with a comprehensive list of analytes that includes TAL metals (plus the metals molybdenum, cesium, strontium, lithium, and tin); TCL VOCs; TCL SVOCs; TCL pesticides and PCBs; radionuclides; indicator parameters; and surficial soil sampling parameters. The comprehensive list was obtained from Appendix B of the *Rocky Flats Plant Site-wide Quality Assurance Project Plan*

(EG&G 1991b) and the final *Plan for the Prevention of Contaminant Dispersion* (PPCD) (DOE 1991a) and is presented in Appendix 3.1.

The comprehensive analyte list has been used for preliminary identification of COPCs for the purposes of this report. This preliminary list of COPCs has been further evaluated within the media-specific sections to identify analytes addressed under current monitoring programs. A shorter, more-specific list of COPCs (List II) was identified for airborne constituents in the final *Plan for Prevention of Contaminant Dispersion* (PPCD) (DOE 1991a). Because the purpose of the PPCD involved providing a consistent mechanism for assessing the potential for airborne transport of site-specific environmental contaminants caused by IAG-related activities, the evaluation of the List II COPCs in the PPCD was limited solely to the inhalation exposure pathway. The analytes included in List II are analytes that had quantitative health risk information available from the EPA's Integrated Risk Information System (IRIS) (EPA 1991a) database and the EPA's Office of Solid Waste and Emergency Response (OSWER) Health Effects Assessment Summary Tables (HEAST) (EPA 1991b) at the time the PPCD was compiled. List II includes toxicity information that was available at the time the PPCD was prepared and may not reflect the current status of toxicological criteria. In addition, constituents from the analyte list that did not have published values in IRIS or HEAST are undergoing ~~further evaluation to determine whether they should be included on List II (DOE 1991a).~~ The list of preliminary COPCs for air is presented as List II in Appendix 3.2. More discussion on airborne constituent transport and List II analytes is provided in the medium-specific section.

3.2.1.2 Materials of Concern

The *Reconstruction of Historical Rocky Flats Operations & Identification of Release Points, Project Tasks 3 & 4* (CDH 1992) report was examined to augment the list of preliminary COPCs. The objective of the report was to select constituents and radionuclides that were most likely to have posed an offsite human health hazard under historical routine and nonroutine plant operations. In the report, an initial set of 629 materials of concern (MOCs) was reduced to 32 through application of a three-stage screening evaluation that included consideration of factors such as known toxicologic properties, release histories, reported inventory quantities, potential offsite health hazards, and the likelihood and potential quantity of release (CDH 1992). Twelve of the 32 MOCs were selected for further evaluation in the report based on the reasonable potential for an offsite release (CDH 1992).

As part of the COPC evaluation, these 12 materials were compared with the list of preliminary COPCs on the comprehensive analyte list. Of the 12, only one, thorium-232, is not included on the comprehensive analyte list. Thorium was used at three buildings in the past: Building 771, where some small-scale thorium work of an unspecified nature was conducted; Building 334, where small quantities of thorium and depleted uranium were sheared; and Building 881, where there was light production of thorium parts and thorium "strikes" to remove impurities from uranium-233. Thorium-232 will be considered for inclusion as a COPC for monitoring conducted at or near these buildings.

3.2.1.3 Integrated Field Sampling Plan and Draft Environmental Restoration Technical Support Document

To identify specific geographical areas or source locations where contaminants from past releases may be of concern, the *Draft Integrated Field Sampling Plan* (EG&G 1993a) and the *Environmental Restoration Technical Support Document* (EG&G 1992b) were reviewed. The Integrated Field Sampling Plan identifies the locations and major chemical contaminants at each IHSS located in OUs 8, 9, 10, 12, 13, and 14. Information on contaminants and the approximate location of releases for OUs 4, 15, and 16 was taken from the *Environmental Restoration Technical Support Document* (EG&G

1992b). This information is presented in Appendix 3.3. Locations of the IHSSs are presented in Figure 3-2.

After an examination of the information in Appendix 3.3, it was found that hexavalent chromium is not on the comprehensive analyte list although total chromium is. Hexavalent chromium will be considered for inclusion as a COPC at IHSSs where it may have been released to the environment. (See Appendix 3.3, IHSSs 121, 136.2, 136.3, and 162.) Hexavalent chromium inclusion will be based on evaluation of environmental fate and transport mechanisms at the particular site. As the RFI/RI program progresses, sample results may also indicate the presence of other contaminants that are not on the COPC list. These contaminants will be reviewed to identify any potential new COPCs.

3.2.1.4 Historical Release Report and Assessment of Potential Environmental Releases of Polychlorinated Biphenyls and Under-Building Contamination

The *Historical Release Report* (EG&G 1992a) and the *Assessment of Known, Suspect and Potential Environmental Releases of PCBs* (EG&G 1991a) were also evaluated to identify locations of potential PCB spills and UBC from past releases. Appendix 3.4 lists the 36 PCB spill locations. Additional information on recent sampling results for PCBs can also be obtained from the RFP Environmental Management Department. Locations of UBC, taken from the *Historical Release Report* (EG&G 1992a), are presented in Appendix 3.5.

3.2.2 Compounds of Interest and Sources

COIs are defined as chemical compounds or wastes that have the potential to be released to the environment during an unplanned event. These substances were identified as important compounds to include in the evaluation of the environmental monitoring system because many of them may not be included as part of the comprehensive analyte list (or list of preliminary COPCs). The COIs were compiled from the RFP chemical product inventories and waste stream inventories. Additionally, sources of radionuclide COIs were identified from the *Reconstruction of Historical Rocky Flats Operations & Identification of Release Points, Project Tasks 3 & 4* (CDH 1992).

3.2.2.1 Chemical Inventories

The CTCS was the primary source of information about chemical inventories at RFP. As chemical substances are delivered to RFP, the field coordinator is responsible for informing the CTCS group of the receipt of the substance, its packaging, and the quantity received. It is important to note that after a chemical is dispensed to the end user, it is no longer tracked by the CTCS.

Chemical inventories contain the chemical or substance name, the quantity, the type of container it was stored in, and the number of the receiving building. Substances listed as nonhazardous on the respective Material Safety Data Sheets (MSDS), such as raw wastewater and nitrogen, argon, propane, and helium gases, were removed from the original CTCS list and are not included as COIs. In addition, because of the large number of various chemical compounds received at RFP, compounds that totaled less than 100 pounds at any particular location were removed from the CTCS list and from consideration as COIs. Compounds deleted from the original file's CTCS list are included in Table A of Appendix 3.6. The remaining COI list was then augmented with a list of other compounds in quantities greater than 100 pounds obtained from the *Fiscal Year 93 Systems Engineering Analysis Facility Characterization and Inventory Report* (EG&G 1993b), and the WEMS and the WSRIC databases. The final list of COIs is in Appendix 3.6, Table B.

To ensure that toxic compounds in quantities less than 100 pounds are not excluded from the COI list, the January 1 to December 31, 1993 EPCRA Tier II report will be reviewed to include the hazardous compounds and extremely hazardous substances (as defined by SARA) as COIs. (Refer to Appendix 3.7).

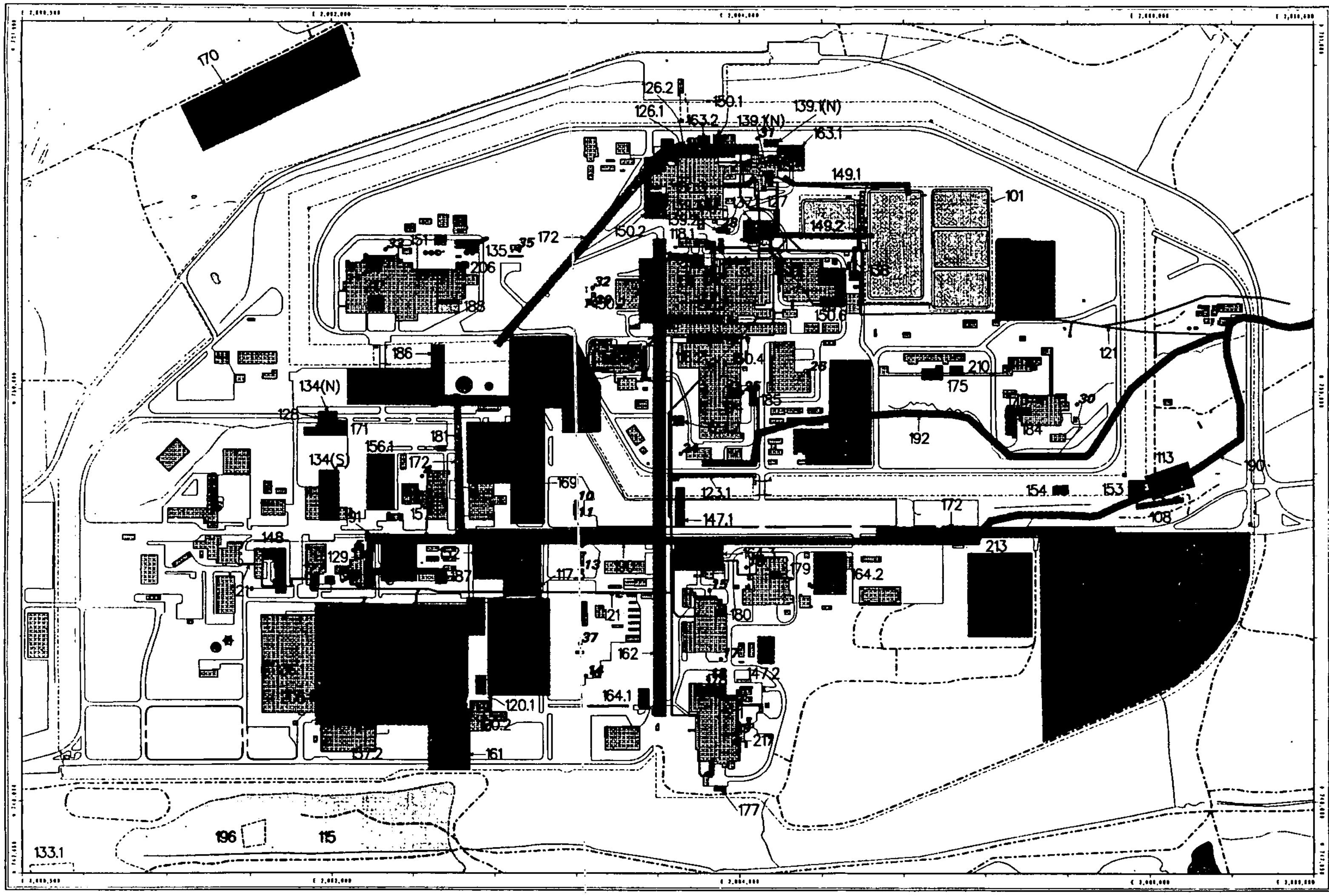


FIGURE 3-2

Industrial Area IM/IRA/DD
IHSS and PCB Site Location Map

EXPLANATION

- OU 2 IHSS
- OU 4 IHSS
- OU 8 IHSS
- OU 9 IHSS
- OU 10 IHSS
- OU 12 IHSS
- OU 13 IHSS
- OU 14 IHSS
- OU 15 IHSS
- OU 16 IHSS
- Buildings or other structures
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences
- Paved roads
- Dirt roads
- Approximate PCB Site Location in Industrial Area

SOURCE

Historical Release Report

U.S. Department of Energy
Rocky Flats Plant

Prepared by:
EG&G ROCKY FLATS
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

MAP ID: [illegible] November 17, 1994

3.2.2.2 Waste Streams

The evaluation of the waste and environmental management system (WEMS) and of the waste stream residue identification and characterization (WSRIC) for additional COIs is discussed in this section.

Waste and Environmental Management System. RFP maintains data on waste streams and waste storage at RFP. The WEMS is stored on a Virtual Address Extension (VAX) system managed by Waste Programs and provides a comprehensive base of information on all waste streams including the buildings, storage units, the types of wastes, and volumes allowed in each unit. This database also contains information on the RCRA designation of each unit and whether the unit is still in use.

All wastes stored in satellite collection areas (SCA) were eliminated as COIs because these areas contain limited quantities of waste on a temporary basis. Wastes stored in 90-day storage areas were eliminated because these areas are used as accumulation points until the wastes are moved to a more permanent RCRA storage facility. Materials historically stored at inactive storage areas (SAs) have also been eliminated as COIs because they are no longer in use. However, data on these areas are still kept in the database because they are an accurate source of the historical use of these storage locations. The list was reduced to include the wastes stored in all of the EG&G RCRA-regulated SAs as of December 7, 1993. This list includes all of the EG&G RCRA-regulated SAs, storage tanks (ST), and treatment areas (TA) in the Industrial Area at the RFP. Appendix 3.8 comprises the lists of RCRA-regulated storage units, as defined by the WEMS database, and the waste streams and COIs associated with them.

Waste Stream Residue Identification and Characterization. RFP also maintains a computerized database that includes information on waste stream constituents, EPA codes, and the process stream inputs. The WSRIC database is managed and administered by the Information Resource Group and is used primarily to track waste streams as they relate to Land Disposal Restrictions (LDR). These data were used to supplement the list of COIs for waste streams.

3.2.2.3 Radionuclides

Other MOCs are the radionuclide elements and waste used and produced during the production operations that occurred at RFP. Five radionuclides were identified as MOCs. The data on these radionuclides and their locations were obtained from the *Reconstruction of Historical Rocky Flats Operations & Identification of Release Points, Project Tasks 3 & 4* (CDH 1992). These COIs are included as Appendix 3.9.

3.3 SUMMARY

The discussion below highlights the major findings and the limitations of these preliminary COPC and COI lists. Discussion related to the reduction of the list of analytes to be addressed in verification monitoring is provided in Section 9.0 of this report.

3.3.1 Constituents of Potential Concern

Research was conducted to identify a preliminary list of COPCs for environmental monitoring based on historical releases at RFP. The result of this work is a list of COPCs that include the comprehensive analyte list (Appendix 3.1) and List II for air (Appendix 3.2). Identified areas that have been affected by past releases include IHSSs, PCB-spill areas, and areas underneath buildings where spills may have occurred (Appendices 3.3, 3.4, and 3.5, respectively).

Thorium-232 will be considered for inclusion as a COPC at or near Buildings 334, 771, and 881 where it was historically used. Hexavalent chromium will also be considered for inclusion as a COPC at IHSSs 121, 136.2, 136.3, and 162 where it may have been released to the environment. Its consideration as a COPC will include evaluation of the environmental fate of chromium. For example, it is highly likely that a hexavalent chromium spill to media containing organic compounds like soil would rapidly be reduced to trivalent chromium, which is less toxic. In addition, as information on new constituents is discovered during the RFI/RI or during building characterization, the constituents will be considered for inclusion as COPCs.

The resulting list of COPCs is large. (Refer to Appendices 3.3 to 3.5.) Further evaluation of COPCs for each medium is conducted within the medium-specific sections and compares the COPC list to the analytes currently monitored for each particular medium. Those COPCs not addressed under existing monitoring are noted along with proposals to include additional analytes in current monitoring programs.

3.3.2 Compounds of Interest

The information provided in this report is based solely on the information provided in Section 3.2. The WEMS database changes constantly since ongoing operations in the Industrial Area at RFP involve the consolidation of waste. Thus, certain elements of Appendix 3.8 may require updating in the future. In addition, the list provided in Appendix 3.8 considers only the active, large RCRA-regulated storage units, as defined by the WEMS database, at the plant site and excludes a number of satellite accumulation and 90-day storage areas. For the COIs identified from the chemical product inventories, Appendices 3.6 and 3.7 may be updated with the latest annual information on chemical compounds reported as part of the current EPCRA reports. These reports will provide a more accurate inventory of the hazardous substances stored at RFP.

3.4 REFERENCES

Colorado Department of Health. 1992 (August). *Reconstruction of Historical Rocky Flats Operations and Identification of Release Points, Project Tasks 3 & 4.* Health Studies on Rocky Flats. Phase I: Historical Public Exposures. Prepared by ChemRisk.

EG&G Rocky Flats, Inc. 1993a. *Draft Integrated Field Sampling Plan for OUs 8, 9, 10, 12, 13, and 14.*

EG&G Rocky Flats, Inc. 1993b (June 16). *Fiscal Year 93 Systems Engineering Analysis Facility Characterization and Inventory Report.*

EG&G Rocky Flats, Inc. 1993c (December 7). Waste Stream and Residue Identification and Inventory (WSRIC) Database.

EG&G Rocky Flats, Inc. 1993d (December 7). Waste and Environmental Management System (WEMS) Database..

EG&G Rocky Flats, Inc. 1993e (November 13). Chemical Control and Tracking System and Chemical Inventory Database.

EG&G Rocky Flats, Inc. 1992a. *Historical Release Report, Rocky Flats Plant, Golden, Colorado.* Environmental Restoration Program.

EG&G Rocky Flats, Inc. 1992b (April). *Environmental Restoration Technical Support Document (ERTSD): A NEPA Support Document For the Rocky Flats Plant.* Draft.

EG&G Rocky Flats, Inc. 1991a (October). *Assessment of Known, Suspect and Potential Environmental Releases of Polychlorinated Biphenyls (PCBs), Preliminary Assessment/Site Description*. Environmental Management Department.

EG&G Rocky Flats, Inc. 1991b (May). *Rocky Flats Plant Site-Wide Quality Assurance Project Plan for CERCLA Remedial Investigations/Feasibility Studies and RCRA Facility Investigations/Corrective Measures Studies Activities*.

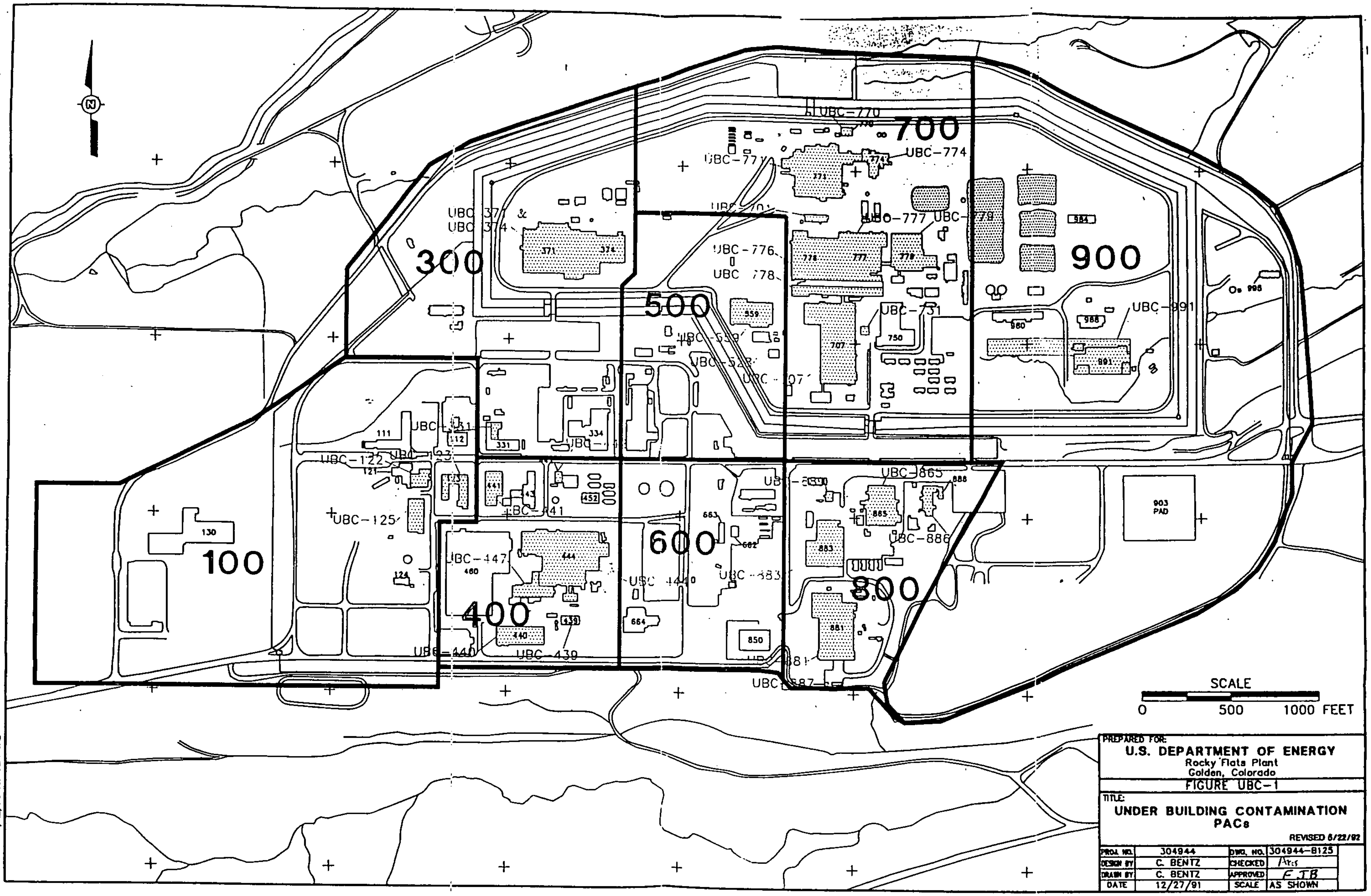
U.S. Department of Energy. 1991a (November). *Plan for Prevention of Contaminant Dispersion*. Final. Rocky Flats Plant. Golden, Colorado.

U.S. Department of Energy, U.S. Environmental Protection Agency Region VIII, and the State of Colorado. 1991b (January 22). *Interagency Agreement*. Docket No. 91-01-22-01. Denver, Colorado.

U.S. Environmental Protection Agency. 1991a. Integrated Risk Information System (IRIS).

U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. 1991b. Health Effects Assessment Summary Tables, FY-1991 Annual, OERR 9200.6-303 (91-1), January.

APPENDIX 3.1
INDUSTRIAL AREA IM/IRA/DD
TARGET COMPOUND LIST



49448125 05/22/92 10:40am CAB

EG&G ROCKY FLATS

ROCKY FLATS PLANT SITE-WIDE

QUALITY ASSURANCE PROJECT PLAN

FOR CERCLA REMEDIAL INVESTIGATIONS/FEASIBILITY STUDIES

AND

RCRA FACILITY INVESTIGATIONS/CORRECTIVE MEASURES STUDIES

ACTIVITIES

ENVIRONMENTAL RESTORATION PROGRAM

ROCKY FLATS PLANT

GOLDEN, COLORADO

Approved By:

Director, Environmental Management 5/7/91

APPENDIX B

Table B1: Analytical Methods, Detection Limits, and Data Quality Objectives

ANALYTICAL METHODS, DETECTION LIMITS, AND DATA QUALITY OBJECTIVES

Analyte	Method	SW	GW	BOREHOLE	SED	Required Detection Limits Water	Soil/Sed.	Precision Objective	Accuracy Objective
INDICATORS									
Total Suspended Solids	EPA 160.2'	X"				10 mg/L	NA	20%RPD'	80-120% LCS Recovery
Total Dissolved Solids	EPA 160.1'	X'	X'			5 mg/L	NA	20%RPD'	80-120% LCS Recovery
pH	EPA 150.1'	X"	X'			0.1 pH units	0.1 pH units	NA	±0.05 pH units
INORGANICS									
Target Analyte List - Metals		X'	X'	X	X			WATER/SOIL	WATER/SOIL
Aluminum	EPA CLP SOW'					200 ug/L'	40 mg/Kg'	**	***
Antimony	EPA CLP SOW'					60	12		
Arsenic (GFAA)	EPA CLP SOW'					10	2		
Barium	EPA CLP SOW'					200	40		
Beryllium	EPA CLP SOW'					5	1.0		
Cadmium	EPA CLP SOW'					5	1.0		
Calcium	EPA CLP SOW'					5000	2000		
Chromium	EPA CLP SOW'					10	2.0		
Cobalt	EPA CLP SOW'					50	10		
Copper	EPA CLP SOW'					25	5.0		
Cyanide	EPA 335.3 (modified for CLP)''					5	10		
Iron	EPA CLP SOW'					100 ug/L'	20 mg/Kg'		
Lead (GFAA)	EPA CLP SOW'					3	1.0		
Magnesium	EPA CLP SOW'					5000	2000		
Manganese	EPA CLP SOW'					15	3.0		
Mercury (CVAA)	EPA CLP SOW'					0.2	0.2		
Nickel	EPA CLP SOW'					40	8.0		
Potassium	EPA CLP SOW'					5000	2000		
Selenium (GFAA)	EPA CLP SOW'					5	1.0		
Silver	EPA CLP SOW'					10	2.0		
Sodium	EPA CLP SOW'					5000	2000		
Thallium (GFAA)	EPA CLP SOW'					10	2.0		
Vanadium	EPA CLP SOW'					50	10		
Zinc	EPA CLP SOW'					20	4.0		

ANALYTICAL METHODS, DETECTION LIMITS, AND DATA QUALITY OBJECTIVES

Analyte	Method	SW	GW	BOREHOLE	SED	Required Detection Limits Water	Soil/Sed.	Precision Objective	Accuracy Objective
Other Metals		X	X	X	X			WATER/SOIL	WATER/SOIL
Molybdenum	EPA CLP SOW (ICAP)					8 ug/L	40 mg/Kg	**	***
Cesium	EPA CLP SOW					1000	200		
Strontium	EPA CLP SOW					200	40		
Lithium	EPA CLP SOW					100	20		
Tin	EPA CLP SOW					200	40		
Other Inorganics									
Percent Solids	EPA 160.3			X	X	NA	10 mg	NA	NA
Sulfide	EPA 376.1			X	X	NA	4 ug/g	Same as metals	Same as metals
ANIONS								Water/Soil	Water/Soil
Carbonate	EPA 310.1	X	X			10 mg/L	NA	Same as metals	Same as metals
Bicarbonate	EPA 310.1	X	X			10 mg/L	NA		
Chloride	EPA 325.2	X	X			5 mg/L	NA		
Sulfate	EPA 375.4	X	X			5 mg/L	NA		
Nitrate as N	EPA 353.2 or 353.3	X	X			1 mg/L	NA		
Fluoride	EPA 340.2	X	X			5 mg/L	NA		
Oil and Grease	EPA 413.2	X				5 mg/L	NA	**	***
*Total Petroleum Hydrocarbons	EPA 418.1			X	X	NA	10 mg/Kg	NA/40	NA/80-120
Target Compound List - Volatiles	EPA CLP SOW	X	X	X	X			WATER/SOIL	WATER/SOIL
Chloromethane	EPA CLP SOW					10 ug/L	10 ug/Kg (low)	**	***
Bromomethane	EPA CLP SOW					10	10		
Vinyl Chloride	EPA CLP SOW					10	10		
Chloroethane	EPA CLP SOW					10	10		
Methylene Chloride	EPA CLP SOW					5	5		
Acetone	EPA CLP SOW					10	10		
Carbon Disulfide	EPA CLP SOW					5	5		
1,1-Dichloroethene	EPA CLP SOW					5	5		
1,1-Dichororethane	EPA CLP SOW					5 ug/L	5 ug/Kg(low)		
total 1,2-Dichloroethene	EPA CLP SOW					5	5		

ANALYTICAL METHODS, DETECTION LIMITS, AND DATA QUALITY OBJECTIVES

Analyte	Method	SW	GW	BOREHOLE	SED	Required Detection Limits Water	Soil/Sed.	Precision Objective	Accuracy Objective
Target Compound List - Volatiles (continued)		X	X	X	X			WATER/SOIL	WATER/SOIL
Chloroform	EPA CLP SOW					5	5	**	***
1,2-Dichloroethane	EPA CLP SOW					1	5		
2-Butanone	EPA CLP SOW					10	10		
1,1,1-Trichoroethane	EPA CLP SOW					5	5		
Carbon Tetrachloride	EPA CLP SOW					5	5		
Vinyl Acetate	EPA CLP SOW					10	10		
Bromodichloromethane	EPA CLP SOW					5	5		
1,2-Dichloropropane	EPA CLP SOW					5	5		
cis-1,3-Dichloropropene	EPA CLP SOW					5	5		
Trichloroethene	EPA CLP SOW					5	5		
Dibromochloromethane	EPA CLP SOW					5	5		
1,1,2-Trichloroethane	EPA CLP SOW					5	5		
Benzene	EPA CLP SOW					5	5		
trans-1,2-Dichloropropene	EPA CLP SOW					5	5		
Bromoform	EPA CLP SOW					5	5		
4-Methyl-2-pentanone	EPA CLP SOW					10	10		
2-Hexanone	EPA CLP SOW					10	10		
Tetrachloroethene	EPA CLP SOW					5	5		
Toluene	EPA CLP SOW					5	5		
1,1,2,2-Tetrachoroethane	EPA CLP SOW					5	5		
Chlorobenzene	EPA CLP SOW					5	5		
Ethyl Benzene	EPA CLP SOW					5	5		
Styrene	EPA CLP SOW					5	5		
Total Xylenes	EPA CLP SOW					5	5		
Target Compound List - Semi-Volatiles			X	X	X			WATER/SOIL	WATER/SOIL
Phenol	EPA CLP SOW					10 ug/L	330 ug/Kg	**	***
bis(2-Chloroethyl)ether	EPA CLP SOW					10	330		
2-Chlorophenol	EPA CLP SOW					10	330		
1,3-Dichlorobenzene	EPA CLP SOW					10	330		
1,4-Dichlorobenzene	EPA CLP SOW					10	330		
Benzyl Alcohol	EPA CLP SOW					10	330		
1,2-Dichlorobenzene	EPA CLP SOW					10	330		
2-Methylphenol	EPA CLP SOW					10	330		
bis(2-Chloroisopropyl)ether	EPA CLP SOW					10	330		
4-Methylphenol	EPA CLP SOW					10	330		
N-Nitroso-Dipropylamine	EPA CLP SOW					10	330		

ANALYTICAL METHODS, DETECTION LIMITS, AND DATA QUALITY OBJECTIVES

Analyte	Method	SW	GW	BOREHOLE	SED	Required Detection Limits Water	Required Detection Limits Soil/Sed.	Precision Objective	Accuracy Objective
Target Compound List - Semi-Volatiles (continued)			X*	X	X			WATER/SOIL	WATER/SOIL
Hexachloroethane	EPA CLP SOW					10	330	**	***
Nitrobenzene	EPA CLP SOW					10	330		
Isophorone	EPA CLP SOW					10	330		
2-Nitrophenol	EPA CLP SOW					10	330		
2,4-Dimethylphenol	EPA CLP SOW					10	330		
Benzoic Acid	EPA CLP SOW					50	1600		
bis(2-Choroethoxy)methane	EPA CLP SOW					10	330		
2,4-Dichlorophenol	EPA CLP SOW					10	330		
1,2,4-Trichlorobenzene	EPA CLP SOW					10	330		
Naphthalene	EPA CLP SOW					10	330		
4-Chloroanaline	EPA CLP SOW					10	330		
Hexachlorobutadiene	EPA CLP SOW					10	330		
4-Chloro-3-methylphenol	EPA CLP SOW					10	330		
2-Methylnaphthalene	EPA CLP SOW					10	330		
Hexachlorocyclopentadiene	EPA CLP SOW					10 ug/L	330 ug/Kg'		
2,4,6-Trichlorophenol	EPA CLP SOW					10	330		
2,4,5-Trichlorophenol	EPA CLP SOW					50	1600		
2-Chloronaphthalene	EPA CLP SOW					10	330		
2-Nitroanaline	EPA CLP SOW					50	1600		
Dimethylphthalate	EPA CLP SOW					10	330		
Acenaphthylene	EPA CLP SOW					10	330		
2,6-Dinitrotoluene	EPA CLP SOW					10	330		
3-Nitroaniline	EPA CLP SOW					50	1600		
Acenaphthene	EPA CLP SOW					10	330		
2,4-Dinitrophenol	EPA CLP SOW					50	1600		
4-Nitrophenol	EPA CLP SOW					50	1600		
Dibenzofuran	EPA CLP SOW					10	330		
2,4-Dinitrotoluene	EPA CLP SOW					10	330		
Diethylphthalate	EPA CLP SOW					10	330		
4-Chlorophenol Phenyl ether	EPA CLP SOW					10	330		
Fluorene	EPA CLP SOW					10	330		
4-Nitroanaline	EPA CLP SOW					50	1600		
4,6-Dinitro-2-methylphenol	EPA CLP SOW					50	1600		
N-nitrosodiphenylamine	EPA CLP SOW					10	330		
4-Bromophenyl Phenyl ether	EPA CLP SOW					10	330		
Hexachlorobenzene	EPA CLP SOW					10	330		
Pentachlorophenol	EPA CLP SOW					50	1600		
Phenanthrene	EPA CLP SOW					10	330		
Anthracene	EPA CLP SOW					10 ug/L	330 ug/Kg'		

ANALYTICAL METHODS, DETECTION LIMITS, AND DATA QUALITY OBJECTIVES

Analyte	Method	SW	GW	BOREHOLE	SED	Required Detection Limits Water	Required Detection Limits Soil/Sed.	Precision Objective	Accuracy Objective
Target Compound List - Semi-Volatiles (continued)			X"	X	X			WATER/SOIL	WATER/SOIL
Di-n-butylphthalate	EPA CLP SOW					10	330	**	***
Fluoranthene	EPA CLP SOW					10	330		
Pyrene	EPA CLP SOW					10	330		
Butyl Benzylphthalate	EPA CLP SOW					10	330		
3,3'-Dichlorobenzidine	EPA CLP SOW					20	660		
Benzo(a)anthracene	EPA CLP SOW					10	330		
Chrysene	EPA CLP SOW					10	330		
bis(2-ethylhexyl)phthalate	EPA CLP SOW					10	330		
Di-n-octyl Phthalate	EPA CLP SOW					10	330		
Benzo(b)fluoranthene	EPA CLP SOW					10	330		
Benzo(k)fluoranthene	EPA CLP SOW					10	330		
Benzo(a)pyrene	EPA CLP SOW					10	330		
Indeno(1,2,3-cd)pyrene	EPA CLP SOW					10	330		
Dibenz(a,h)anthracene	EPA CLP SOW					10	330		
Benzo(g,h,i)perylene	EPA CLP SOW					10	330		
Target Compound List - Pesticides/PCBs			X"	X	X			WATER/SOIL (%RPD)	WATER/SOIL (% Recovery)
alpha-BHC	EPA CLP SOW					0.05 ug/L	8.0 ug/Kg'	**	***
beta-BHC	EPA CLP SOW					0.05	8.0		
delta-BHC	EPA CLP SOW					0.05	8.0		
gamma-BHC (Lindane)	EPA CLP SOW					0.05	8.0		
Heptachlor	EPA CLP SOW					0.05	8.0		
Aldrin	EPA CLP SOW					0.05 ug/L	8.0 ug/Kg'		
Heptachlor Epoxide	EPA CLP SOW					0.05	8.0		
Endosulfan I	EPA CLP SOW					0.05	8.0		
Dieldrin	EPA CLP SOW					0.10	16.0		
4,4'-DDE	EPA CLP SOW					0.10	16.0		
Endrin	EPA CLP SOW					0.10	16.0		
Endosulfan II	EPA CLP SOW					0.10	16.0		
4,4'-DDD	EPA CLP SOW					0.10	16.0		
Endosulfan Sulfate	EPA CLP SOW					0.10	16.0		
4,4'-DDT	EPA CLP SOW					0.10	16.0		
Methoxychlor	EPA CLP SOW					0.5	80.0		
Endrin Ketone	EPA CLP SOW					0.10	16.0		
alpha-Chlordane	EPA CLP SOW					0.5	80.0		
gamma-Chlordane	EPA CLP SOW					0.5	80.0		
Toxaphene	EPA CLP SOW					1.0	160.0		

ANALYTICAL METHODS, DETECTION LIMITS, AND DATA QUALITY OBJECTIVES

Analyte	Method	SW	GW	BOREHOLE	SED	Required Detection Limits Water	Soil/Sed.	Precision Objective	Accuracy Objective
Target Compound List - Pesticides/PCBs (continued)			X[u]	X	X			WATER/SOIL (%RPD)	WATER/SOIL (% Recovery)
AROCLOR-1016	EPA CLP SOW'					0.5	80.0		
AROCLOR-1221	EPA CLP SOW'					0.5	80.0		
AROCLOR-1232	EPA CLP SOW'					0.5	80.0		
AROCLOR-1242	EPA CLP SOW'					0.5	80.0		
AROCLOR-1248	EPA CLP SOW'					0.5	80.0		
AROCLOR-1254	EPA CLP SOW'					1.0	160.0		
AROCLOR-1260	EPA CLP SOW'					1.0	160.0	(Replicate Analyses)	(Laboratory Control Sample)
RADIONUCLIDES									
Gross Alpha	f,g,h,i,k,l,m,n,s	X[t,u]	X[t]	X	X	2 pCi/L	4 pCi/g	**	***
Gross Beta	f,g,h,i,k,l,m,n,s	X[t,u]	X[t]	X	X	4 pCi/L	10 pCi/g		
Uranium 233+234	f,h,i,m,l,n,s	X[t,u]	X[t]	X	X	0.6 pCi/L	0.3 pCi/g		
Uranium 235,238	f,h,i,l,m,n,s	X[t,u]	X[t]	X	X	0.6 pCi/L	0.3 pCi/g		
Americium 241	i,l,p,q,s	X[t,u]	X[t]	X	X	0.01 pCi/L	0.02 pCi/g		
Plutonium 239+240	i,l,o,p,s	X[t,u]	X[t]	X	X	0.01 pCi/L	0.03 pCi/g		
Tritium	f,g,h,i,l,m,s	X[u]	X[u]	X	X	400 pCi/L	400 pCi/L		
Strontium 89,90	f,h,i,l,m,s			X	X	NA	1 pCi/g		
Strontium 90 only	f,h,i,l,m,s	X[t,u]	X[t]			1 pCi/L	NA		
Cesium 137	h,i,l,m	X[t,u]	X[t]	X	X	1 pCi/L	0.1 pCi/g		
Radium 226	f,g,h,i,l,m',s	X[t,u]	X[t]			0.5 pCi/L	0.5 pCi/g		
Radium 228	f,g,h,i,l,m',s	X[t,u]	X[t]			1 pCi/L	0.5 pCi/g		
SURFICIAL SOIL SAMPLING PARAMETERS									
Total Organic Carbon	ALPHA 5310'						1 mg/kg	**	***
Carbonate	EPA 310.1'						2 mg/kg		
pH	EPA 150.1'						0.1 pH units		
Specific Conductance	EPA 120.1'						2.5 umho/cm		
Plutonium 239+240	i,l,o,p,s						0.03 pCi/g		
Americium 241	i,l,p,q,s						0.01 pCi/g		
Uranium 233,234,235,238	f,h,i,l,m,n,s						0.06 pCi/g		

ANALYTICAL METHODS, DETECTION LIMITS, AND DATA QUALITY OBJECTIVES

Analyte	Method	SW	GW	BOREHOLE	SED	Readability Objective	Accuracy
FIELD PARAMETERS							
pH	1	X	X			± 0.1 pH unit	± 0.2 pH units
Specific Conductance	1	X	X			2.5 umho/cm 25 umho/cm 250 umho/cm	± 2.5% max. error at 500, 5000, 50000 umhos/cm plus probe; ± 3.0% max error at 250, 2500, and 25000 plus probe accuracy of ± 2.0%.
Temperature	1	X	X			± 0.1°C	± 1.0°C
Dissolved Oxygen	1	X				± 0.1 mg/L	± 10%

ANALYTICAL METHODS, DETECTION LIMITS, AND DATA QUALITY OBJECTIVES

* For samples collected from IHSSs 102 and 105 only (BH01,BH02,BH03,BH04,BH05,BH06,BH07,BH08 (MW33),BH09,BH15,BH16,BH17,BH18,MW01,MW02,MW03,MW33 (BH08)).
** Precision objective = control limits specified in referenced method and/or Data Validation Guidelines.
*** Accuracy objective = control limits specified in referenced method (in GRRASP for radionuclides).
F = Filtered
U = Unfiltered

1. Measured in the field in accordance with instrument manufacturer's instructions. The instruments to be used are specified in Section 12.
2. Medium soil/sediment required detection limits for pesticide/PCB TCL compounds are 15 times the individual low soil/sediment required detection limit.
3. Detection limits listed for soil/sediment are based on wet weight. The detection limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.
4. Higher detection limits may only be used in the following circumstance: If the sample concentration exceeds five times the detection limit of the instrument or method in use, the value may be reported even though the instrument or method detection limit may not equal the required detection limit. This is illustrated in the example below:

   For lead:

   Method in use - ICP
   Instrument Detection Limit (IDL) - 40
   Sample Concentration - 220
   Required Detection Limit (RDL) - 3

   The value of 220 may be reported even though the instrument detection limit is greater than the RDL.

   Note: The specified detection limits are based on a pure water matrix. The detection limits for samples may be considerably higher depending on the sample matrix.
5. If gross alpha > 5 pCi/L, analyze for Radium 226; if Radium 226 > 3 pCi/L, analyze for Radium 228.
6. The detection limits presented were calculated using the formula in N.R.C. Regulatory Guide 4.14, Appendix Lower Limit of Detection, pg. 21, and follow:

$$LLD = \frac{4.66\,(BKG/BKG\ DUR)^{1/2}}{(2.22)(Eff)(CR)(SR)(e^{-\lambda t})(Aliq)}$$

$$MDA = \frac{4.66\,(BKG/Sample\ DUR)^{1/2}}{(2.22)(Eff)(CR)(SR)e^{-\lambda t}(Aliq)}$$

Where:

LLD = Lower Limit of Detection in pCi per sample unit.
BKG = Instrument Background in counts per minute (CPM).
Eff = Counting efficiency in cpm/disintegration per minute (dpm).
CR = Fractional radiochemical yield.
SR = Fractional radiochemical yield of a known solution.
λ = The radioactive decay constant for the particular radionuclide.
t = The elapsed time between sample collection and counting.
Aliq = Sample volume.
BKG DUR = Background count duration in minutes.

MDA = Minimum Detectable Activity in pCi per sample unit
BKG = same as for LLD
Eff = same as for LLD
CR = same as for LLD
SR = same as for LLD
λ = same as for LLD
t = same as for LLD
Aliq = same as for LLD
Sample DUR = sample count duration in minutes

ANALYTICAL METHODS, DETECTION LIMITS, AND DATA QUALITY OBJECTIVES

7. On 500 umho/cm range.
8. On 5000 umho/cm range.
9. On 50000 umho/cm range.

a. U.S. Environmental Protection Agency Contract Laboratory Program Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, 7/88 (or latest version).
b. U.S. Environmental Protection Agency Contract Laboratory Program Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, 7/88 (or latest version). The specific method to be utilized is at the laboratory's discretion provided it meets the specified detection limit.
c. U.S. Environmental Protection Agency Contract Laboratory Program Statement of Work for Organic Analysis, Multi-Media, Multi-Concentration, 2/88 (or latest version).
d. Methods are from "Methods for Chemical Analysis of Water and Wastes," U.S. Environmental Protection Agency, 1983, unless otherwise indicated.
e. Methods are from "Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods," (SW-846, 3rd Ed.), U.S. Environmental Protection Agency.
f. U.S. Environmental Protection Agency, 1979, Radiochemical Analytical Procedures for Analysis of Environmental Samples, Report No. EMSL-LY-0539-1, Las Vegas, NV, U.S. Environmental Protection Agency.
g. American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1985. Standard Methods for the Examination of Water and Wastewater, 16th ed., Washington, D.C., Am. Public Health Association.
h. U.S. Environmental Protection Agency, 1976. Interim Radiochemical Methodology for Drinking Water, Report No. EPA-600/4-75-008. Cincinnati U.S. Environmental Protection Agency.
i. Harley, J.H., ed., 1975, ASL Procedures Manual, HASL-300; Washington, D.C., U.S. Energy Research and Development Administration.
j. U.S. EPA, 1982. "Methods for Organic Analysis of Municipal and Industrial Waste Water," US EPA-600/4-82-057.
k. "Handbook of Analytical Procedures," USAEC, Grand Junction Lab. 1970, page 196.
l. "Prescribed Procedures for Measurement of Radioactivity in Drinking Water," EPA-600/4-80-032, August 1980, Environmental Monitoring and Support Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio 45268.
m. "Methods for Determination of Radioactive Substances in Water and Fluvial Sediments," U.S.G.S. Book 5, Chapter A5, 1977.
n. "Acid Dissolution Method for the Analysis of Plutonium in Soil," EPA-600/7-79-081, March 1979, U.S. EPA Environmental Monitoring and Support Laboratory, Las Vegas, Nevada, 1979.
o. "Procedures for the Isolation of Alpha Spectrometrically Pure Plutonium, Uranium, and Americium," by E.H. Essington and B.J. Drennon, Los Alamos National Laboratory, a private communication.
p. "Isolation of Americium from Urine Samples," Rocky Flats Plant, Health, Safety, and Environmental Laboratories.
q. "Radioactivity in Drinking Water," EPA 570/9-81-002.
r. If the sample or duplicate result is <5 x IDL, then the control limit is ± IDL.
s. U.S. EPA, 1987. "Eastern Environmental Radiation Facility Radiochemistry Procedures Manual," EPA-520/5-84-006.

APPENDIX 3.2
INDUSTRIAL AREA IM/IRA/DD
LIST II FOR
AIR INHALATION PATHWAY

LIST II - POTENTIAL CONTAMINANTS OF CONCERNS FOR AIR PATHWAY
ATTACHMENT A.1.2

TAKEN FROM THE *PLAN FOR THE*

PREVENTION OF CONTAMINANT DISPERSION

(DOE 1991a)

PRINCIPAL CONTAMINANTS – METALS/INORGANICS

	Information Source	Inh RfC (s) (mg/kg/day)	Inh SF (mg/kg/day)−1
senic	a,b	-------	0.5
rium	a,b	0.001	-------
eryllium	b	-------	8.4
Cadmium	b	-------	6.1
Chromium III	b	5.70E−06	-------
Chromium VI	b	5.70E−06	0.012
Manganese	a,b	1.14E−04	-------
Mercury	b	8.60E−05	-------

PRINCIPAL CONTAMINANTS – RADIONUCLIDES

	Information Source	Inhalation (pCi)−1
Uranium 233 + 234	b	2.70E−08
Uranium 235	b	2.50E−08
Uranium 238	b	2.40E−08
Americium 241	b	4.00E−08
Plutonium 239 + 240	b	4.10E−08
Tritium (gas)	b	7.80E−14
Strontium 89 + 90	b	2.90E−12
Strontium 90	b	5.60E−11
Cesium 137	b	5.00E−10
Radium 226	b	8.10E−08
Radium 228	b	1.80E−08

PRINCIPAL CONTAMINANTS – VOLATILE ORGANICS

	Information Source	Inh RfC (s) (mg/kg/day)	Inh SF (mg/kg/day)−1
Chloroform	a,b	-------	0.081
1,1,1−Trichloroethane	b	3	-------
Carbon Tetrachloride	b	-------	0.13
Benzene	a,b	-------	0.29
Toluene	a,b	0.6	-------
chloromethane (Methylene Chloride)	a,b	0.9	0.0002
ylenes	a,b	0.09	-------
Methyl Ethyl Ketone (2−Butanone)	a,b	0.9	-------
1,2−Dichloroethane	a,b	-------	0.091
Bromomethane	a,b	0.2	-------
Carbon Disulfide	a,b	0.003	-------
1,1−Dichloroethene	a,b	-------	1.2
1,1−Dichloroethane	b	1	-------
Vinyl Acetate	a,b	0.06	-------
1,3−Dichloropropene	a,b	0.06	0.13
1,1,2−Trichloroethane	b	-------	0.057
Bromoform	a,b	-------	0.0039
Tetrachloroethene	b	-------	0.018
Chlorobenzene	a,b	0.05	-------
Ethylbenzene	a,b	0.3	-------
Styrene	a,b	-------	0.03
Vinyl Chloride	a,b	-------	0.029
1,2−Dichloroethane	a,b	-------	0.091
1,2−Dichloropropane	a,b	-------	0.13
1,1,2,2,−Tetrachloroethane	a,b	-------	0.2

PRINCIPAL CONTAMINANTS – SEMIVOLATILE ORGANICS

	Information Source	Inh RfC (s) (mg/kg/day)	Inh SF (mg/kg/day)−1
bis(2−chloroethyl)ether	a,b	-------	1.1
1,4−Dichlorobenzene	a,b	0.7	-------
1,2−Dichlorobenzene	a,b	2	-------
Nitrobenzene	a,b	0.02	-------
Hexachloroethane	a,b	-------	0.014
1,2,4−Trichlorobenzene	b	0.03	-------
Hexachlorobutadiene	a,b	-------	0.078
Hexachlorocyclopentadiene	a,b	0.0007	-------
2,4,6−Trichlorophenol	a,b	-------	0.011
Hexachlorobenzene	a,b	-------	1.6

– Integrated Risk Information System
b – Health Effects Assessment Summary Tables

PRINCIPAL CONTAMINANTS – PESTICIDES/PCBs

	Information Source	Inh RfC (s) (mg/kg/day)	Inh SF (mg/kg/day)-1
Hexachlorocyclohexane (alpha)	a,b	-------	6.3
Hexachlorocyclohexane (beta)	a,b	-------	1.8
Heptachlor	a,b	-------	4.5
Heptachlor Epoxide	a,b	-------	9.1
Aldrin	a,b	-------	17
Dieldrin	a,b	-------	1.6
DDT	a,b	-------	0.34
Chlordane (alpha, gamma)	a,b	-------	1.3
Toxaphene	a,b	-------	1.1

APPENDIX 3.3
INDUSTRIAL AREA IM/IRA/DD
SUMMARY OF INDIVIDUAL
HAZARDOUS SUBSTANCE SITES AND LOCATIONS

APPENDIX 3.3
INDUSTRIAL AREA IM/IRA/DD
SUMMARY OF INDIVIDUAL HAZARDOUS SUBSTANCE SITES
LOCATION AND HAZARD SUMMARY BY IHSS

FINAL

OU	IHSS	LOCATION	DESCRIPTION
4	101	Central portion of RFP inside the PA	Liquids and sludges: Pu, Am, tritium, U, Be, Cd, Cr, Ni and nitrates. Soils: metals, nitrate, K, Na, Ca, Mg, and radionuclides. Bedrock groundwater: nitrates and radionuclides. Surface water (seeps): nitrate, metals and radionuclides. Organic chemicals have been reported near detection limits in water samples from the ITS.
8	118.1	West of Building 730	A 20- by 40-foot area near a former UST containing carbon tetrachloride or trichloroethene west of Building 730.
8	118.2	South end of Building 77	A 20- by 30-foot area between Buildings 707 and 778, a carbon tetrachloride spill. (Organic solvents [ERTSD].)
8	123.1	Valve Vault 7 southwest of Building 707	A 40- by 40-foot area south of Sage Avenue and west of North Street. A process wastewater spill, containing uranium solvents, oils, beryllium, nitric acid, hydrochloric acid and fluoride.
8	135	Cooling Tower Blowdown Northeast of Building 374	A 115- by 40- by 50-foot area northeast of Building 374. Possible tritium contamination from cooling tower blowdown water.
8	137	Cooling Tower Blowdown Buildings 712 and 713	A 10-foot wide zone beyond the foundations of Buildings 712 and 713, possible contamination from cooling tower blowdown water contaminated with chromates.
8	138	Cooling Tower Blowdown near Building 779	A 50- by 50-foot area north of Building 727. A pipe leak and effluent spill toward trench 6, possible chromium and radiation activity.*

FINAL

APPENDIX 3.3
INDUSTRIAL AREA IM/IRA/DD
SUMMARY OF INDIVIDUAL HAZARDOUS SUBSTANCE SITES
LOCATION AND HAZARD SUMMARY BY IHSS

OU	IHSS	LOCATION	DESCRIPTION
8	139.1 (North & South)	Hydroxide Tank Area Buildings 771 and 774	NaOH steam condensate tanks and KOH tank, possible chromium and 3,000 disintegrations per minute per liter alpha activity. (HCI, HF, HNO_3, H_2SO4, NaOH, [ERTSD].)*
8	139.2	Hydrofluoric acid Tank Area - Building 174	Possible spill from horizontal 1,300-pound hydrofluoric acid cylinders.*
8	144	Sewer Line Breaks near Building 730, Tanks 776 A-D	Four underground waste holding tanks north of Building 776 and east of Building 70/A. Possible elevated radioactivity.
8	150.1	Radioactive site north of Building 771	Radioactive waste leaks north of Buildings 771 and 776.*
8	150.2	Radioactive site west of Buildings 771 and 776	From the 1957 fire in Building 771. Water from the fire fighting contaminated soil west of Buildings 771 (plutonium).*
8	150.3	Radioactive site west of Buildings 771 and 774	Radioactive leak from process waste lines into a tunnel that connects Buildings 771 and 774, could have also contained nitrates, and other chemical contaminants.
8	150.4	Radioactive site east of Building 750	Leaking process waste line near a sump located outside Door 3 south of Building 778. There is a possibility that decontamination of equipment occurred in the area after 1969 fire, probably contaminated with plutonium.
8	150.5	Radioactive site west of Building 707	Documented releases from overflow of Valve Vault 7 and an original process waste line (OPWL) valve vault removed in March 1973. U, solvents, oils, Be,NO_2, NO_3, HCl and Fluoride.*

OU	IHSS	LOCATION	DESCRIPTION
8	150.6	Radioactive site south of Building 779	Contaminated oil from a cut-apart drum was tracked by pedestrians to the first floor dock and surrounding outdoor areas south and east of Building 779.
8	150.7	Radioactive site south of Building 776	From 1969 fire, plutonium tracked outside Building 776 by fire fighting.
8	150.8	Radioactive site south of Building 779	An improperly opened, radioactively contaminated waste drum was spread by pedestrian tracking.*
8	151	Fuel oil leak - Tank 262 north of Building 374	UST No. 2 diesel fuel oil, a 45- by 60-foot area centered over tank.*
8	163.1	Radioactive site north of Building 774	A 50- by 125-foot area northwest of Building 774. Reportedly, area used to wash radioactive-contaminated vehicles. (Am [ERTSD]).*
8	163.2	Radioactive site north of Buildings 771 and 774	An 8- by 8-foot slab buried near Building 771A. Slab used as a foundation for a 5,000-gallon stainless steel tank used in the filtrate recovery ion exchange system. (Am [EG&G 1992g]).*
8	172	Central Avenue Waste Spill	Approximately 1 mile of Central Avenue from 903 Pad to Building 771. A drum of contaminated lathe coolant leaked during its transport to the waste treatment facility. Possibly carbon tetrachloride and machine cutting oil, percholoroethylene, uranium, and plutonium.*

APPENDIX 3.3
INDUSTRIAL AREA IM/IRA/DD
SUMMARY OF INDIVIDUAL HAZARDOUS SUBSTANCE SITES
LOCATION AND HAZARD SUMMARY BY IHSS

OU	IHSS	LOCATION	DESCRIPTION
8	173	Radioactive site 900 Area, dock area, Building 991	Activities at the dock included cleaning of depleted uranium parts with acetone, perchloroethene, and trichloroethane. (Am [ERTSD].)*
8	184	Radioactive site Building 991 Steam Cleaning Area (near Building 992)	A 55- by 75-foot area located south of Building 991 used to steam clean radioactively contaminated equipment and drums.
8	188	Acid leak, the southeast corner of Building 374	A 55-gallon drum containing nitric and hydrochloric acid leaked. The mixture was suspected to be a waste leaching solution originating from the 400 Area, which may have contained trace heavy metals.
9	121	OPWL. A network of pipelines and tanks that extends throughout much of the RFP main production complex. It is 35,000 feet of underground pipelines and 39 tank locations for a total of 65 tanks.	Used to transport and temporarily store process wastes to onsite treatment and discharge points. Potential contaminants include uranium 238 and 235; plutonium, nitrate, acids, bases, hexavalent chromium, beryllium, iron, iodine, phosphate, tritium.*
9	122	Underground Storage Tanks South of Building 441	Tanks stored process waste from Buildings 441 and 123. Nitrates and radionuclides would be present.
9	123.2	Valve Vault West of Building 707	A liquid release containing uranium, solvents, oil, beryllium, nitric and hydrochloric acids, and fluoride.

OU	IHSS	LOCATION	DESCRIPTION
9	124.1 124.2	Three tanks east of Building 774	A release of process wastewater, high in nitrate and contaminated with plutonium and uranium. (Metals [ERTSD].)
9	124.3	Three tanks east of Building 774	A release of process wastewater, high in nitrate and contaminated with plutonium and uranium.
9	125	Holding tank east of Building 774	A release of process wastewater, high in nitrate and contaminated with plutonium and possibly uranium.
9	126.1	Out-of-service process waste tanks in Building 728	A release of liquid process wastes contaminated with nitrate, plutonium, uranium, and various other organic and inorganic constituents.
9	126.2	Out-of-service process waste tanks in Building 728	A release of liquid process wastes contaminated with nitrate, plutonium, uranium, and various other organic and inorganic constituents.
9	127	Process waste line between Building 774 and the sanitary wastewater treatment plant	Numerous line breaks. The waste is characterized by high nitrate levels with plutonium contamination.
9	132	Underground storage tanks under Building 730	Leaking underground storage tanks, containing mostly water with small amounts of detergent and radionuclides.
9	146.1	Six underground concrete process waste holding tanks south of the original Building 774	The process waste stored in the tanks was an aqueous solution with plutonium, uranium, acids, and caustics.

OU	IHSS	LOCATION	DESCRIPTION
9	146.6	Six underground concrete process waste holding tanks south of the original Building 774	The process waste stored in the tanks was an aqueous solution with plutonium, uranium, acids, and caustics.
9	147.1	Process waste line north of Building 881	High nitrate levels, uranium, plutonium, beryllium, acids, and solvents.*
9	149.1	Two PVC pipes between Building 774 and the 207 Solar Evaporation Ponds	Low-level radioactive wastes containing caustics and acids.
9	149.2	Two PVC pipes between Building 774 and the 207 Solar Evaporation Ponds	Low-level radioactive wastes containing caustics and acids.
9	159	Radioactive site Building 559	Process waste consisting of an aqueous solution with radioactive constituents.
9	215	A concrete mixed waste storage tank near Building 771	The tank held sludge from second stage precipitation of liquid process waste from Building 771, and silver effluent from Building 774.
10	129	Approximately 25 feet east of Building 443	Underground fuel oil tank and ancillary piping. Also stored #2 diesel, wastewater and compressor oil, solvents, and trace amounts of 1,1,1-trichloroethane. (Hg, Cd, Cu, Pb [ERTSD].)

OU	IHSS	LOCATION	DESCRIPTION
10	170	Property Utilization and Disposal Storage Yard. Approx. 260- by 1,000-foot area, southeast of the Present Landfill	Area used to store various containers that contained waste oils and spent solvents.
10	174	A 60- by 60-foot area near the northeast corner, and a 20- by 40-foot area along the northern fence line, of the Property Utilization and Disposal Storage Yard	Area used to store drums of maintenance and fabrication shops waste liquids, waste paints, waste paint thinner, stainless steel chips coated with freon-based or oil-based lathe coolant. (Metals, nitrates and radionuclides [ERTSD].)
10	175	A 25- by 25-foot area in the eastern third of a storage yard south of Building 980	Area used to store drums of maintenance and fabrication shops waste liquids. Generally, drums contained waste oils and thinners. (Metals, radionuclides [ERTSD].)
10	176	Swiggerton & Walberg Contractor Storage Yard. A 290- by 390-foot area, approximately 50 feet east of solar evaporation ponds, in vicinity of Building 964	Containers stored intermittently throughout area, including mineral spirits, waste oil, volatile organic compounds and metals. Low level radioactivity has also been detected. (Nitrates, radionuclides [ERTSD].)
10	177	Two 10- by 20-foot areas in the eastern and western sections respectively, of Building 885	Drum storage areas. Western area stored unused and waste oils. Eastern area stored unused and waste paint and paint solvents. Waste materials also contained low-level radioactive wastes.

OU	IHSS	LOCATION	DESCRIPTION
10	181	Small portion of parking lot north of Building 334	Former location of 8- by 20-foot cargo container used to store drums of machine oils, solvents, coolants and possibly low-level radioactive wastes.*
10	182	An approx. 1,700-square-foot area between Buildings 444 and 453	A drum storage area. Drums contained waste hydraulic oils and chlorinated solvents. Beryllium and low-level depleted uranium oxide waste contamination present in some of the waste.
10	205	Outside of Building 460, along southeast corner of the building	Portable cylindrical vessels used to collect waste nitric acid, hydrofluoric acid, and ammonium salts.
10	206	East side of Building 374	Area where an 8-foot-diameter by 49.5-foot-long steel storage tank was located. Tank stored off-specification Building 374 product water. Water contained low concentrations of tritium.*
10	207	A 9.5- by 9-foot area at the east side of Building 444	Bermed area that contained acid waste dumpsters. Acids were a mixture of phosphoric acid, sulfuric acid and chromium trioxide. Waste acid contained cyanide, cadmium, chromium, lead, silver, arsenic, uranium, americium, and tritium contamination. Dumpsters have been removed.
10	208	Approximately 30 feet west of Building 453	An 8- by 20-foot cargo container. Wastes stored were a composite of nitric acid with silver, sodium fluoride, sodium fluoride solution, plating acids (hydrochloric, nitric, hydrofluoric) with chromium plating solution, cadmium cyanide solution, nickel sulfate, developer, and fixer.

APPENDIX 3.3
INDUSTRIAL AREA IM/IRA/DD
SUMMARY OF INDIVIDUAL HAZARDOUS SUBSTANCE SITES
LOCATION AND HAZARD SUMMARY BY IHSS

OU	IHSS	LOCATION	DESCRIPTION
10	210	South of Spruce Avenue and east of 10th Street, approx. 40 feet south of Building 980	An 8- by 20-foot cargo container and adjacent 20- by 20-foot area used to store drums of waste auto oil, solvents, paints, thinner, grease, gasoline, diesel fuel, and fiberglass resins and catalysts.
10	213	Southeastern portion of the production area	A 439- by 295-foot area covered with asphalt. Used to store pondcrete; a mixture of Solar Evaporation Pond sludge and sediment with portland cement. Potential contamination by nitrate, low-level radiation, and volatile organic compounds.
10	214	Approx. 90 feet east of Building 750	A 142,000-square-foot area covered with asphalt. Used to store pondcrete; a mixture of Solar Evaporation Pond sludge and sediment with portland cement. Solidified low-level radioactive and hazardous wastes.
12	116.1	West Loading Dock Building 447	Spills and leaks from oil stored in drums. Suspected solvents and hydrocarbons, may also be low-level radioactive materials.
12	116.2	South Loading Dock Building 444	Many incidents of drum leakage and spills. Contaminants include uranium, uranium oxide, tetrachloride, nitric acid, chlorinated hydrocarbon solvents, and beryllium. Beryllium soil concentrations range from 350 to 1,000 micrograms per gram. Direct uranium activity readings were recorded as high as 7,500 disintegrations per minute. Direct uranium air counts have been recorded as high as 1,372 disintegrations per minute.

OU	IHSS	LOCATION	DESCRIPTION
12	136.1	Cooling Tower Pond east of Building 444	Used to collect solutions used to clean the cooling towers, reportedly acidic or lithium dichromate, lithium chromate and hexavalent chromium. Small amounts of depleted uranium may have been buried here as well.
12	136.2 136.3	Cooling Tower Pond east of Building 444	Used to collect solutions used to clean the cooling towers, reportedly acidic or lithium dichromate, lithium chromate and hexavalent chromium. Small amounts of depleted uranium may have been buried here as well.
12	157.2	Radioactive site south Area Building 444, 447, 440 and 439	Several incidents of spills and fires, contaminated soils around these buildings, including depleted and enriched uranium, beryllium, chlorinated hydrocarbon solvents, including carbon tetrachloride, hydraulic oil, lithium, and chromium. (Pu may be present [ERTSD].)*
12	187	Sulfuric Acid Spill east of Building 4433	1,500 gallons of 94 percent sulfuric acid spilled from an aboveground storage tank. 32,000 pounds of lime were added to neutralize the acid. In addition, 200 additional gallons went to the sewer system.
12	120.1	Fiberglassing Area north of Building 664	Spills of polyester resin peroxide catalyst materials and unspecified cleaning solvents. Higher than background levels of gamma radiation from plutonium, uranium, and americium have been detected.
12	120.2	Fiberglassing Area west of Building 664	Potential residue from spills of polyester resin peroxide catalyst and unspecified cleaning solvents. Higher than background levels of radiation from plutonium and uranium.

APPENDIX 3.3
INDUSTRIAL AREA IM/IRA/DD
SUMMARY OF INDIVIDUAL HAZARDOUS SUBSTANCE SITES
LOCATION AND HAZARD SUMMARY BY IHSS

OU	IHSS	LOCATION	DESCRIPTION
12	189	Nitric Acid Tanks north and west of Building 881	Three nitric acid spills. Two of the spills were neutralized with sodium bicarbonate.
12	147.2	Building 881 Conversion Activity, 150 feet south of Building 865, 250 feet east of Building 883 and 450 feet south of Central Avenue	Storage of equipment during conversion process. Beryllium and enriched or depleted uranium.
13	117.1	North Chemical Storage Site, northeast of Building 552, west of Building 559	Buried nonradioactive material including aluminum machine turnings, rings, shapes, overlays and other metal parts, contaminated with uranium chips.*
13	117.2	Middle Chemical Storage Site, east of Building 551	Multipurpose storage, including acids, soaps, solvents, beryllium chips and turnings, drums of aluminum scraps and drums of aluminum nitrate. Monitoring indicated occasional buildup of radioactivity.
13	117.3	South Chemical Storage Site, southwest corner of Central Avenue and Seventh Street	A wooden waste box containing a glovebox that leaked contaminated oil. Probably plutonium contaminated.
13	128	Oil Burn Pit No. 1 Waste Leak, north of Building 335	Experimental oil burning in a pit now buried. Reportedly 200 gallons of what is suspected to have been perchloroethene containing depleted uranium.

APPENDIX 3.3
INDUSTRIAL AREA IM/IRA/DD
SUMMARY OF INDIVIDUAL HAZARDOUS SUBSTANCE SITES
LOCATION AND HAZARD SUMMARY BY IHSS

OU	IHSS	LOCATION	DESCRIPTION
13	134	Lithium Metal Destruction Site, beneath an eastern addition of Building 331 and Sage Avenue	Waste lithium mixed with machinery oils was burned in 55-gallon drums for the fire department training. Sodium, calcium, solvent-type chemical compounds; graphite; and magnesium may also have been present.
13	148	Waste Spills outside Building 123	Small spills of nitrate-bearing wastes. Leaks from process waste lines. Possible low-level radioactive wastes, with nitrates.
13	152	Fuel Oil Tank east of Building 452	No. 6 fuel oil spills and leaks.
13	157.1	North Area Radioactive Site, Building 444	Leak of spills from laundry operations, levels of radioactivity in soils range from $1.8x10^4$ to $5.2x10^5$ disintegrations per minute per kilogram. Contaminants include depleted uranium, enriched uranium, beryllium, and solvents. (Pu may be present [ERTSD].)*
13	158	Building 551 Radioactive Site	Laundry dock, storage area for offsite shipment by train. Low-level radioactive contamination from uranium.
13	169	Waste Peroxide Drum Burial, Chemical Storage Area east of Building 551	Spill of 35 percent hydrogen peroxide.
13	171	Solvent Burning Ground east of Building 335	Diesel fuel and gasoline burned and extinguished for training purposes, magnesium may also be present. Waste solvents may also have been present.

APPENDIX 3.3
INDUSTRIAL AREA IM/IRA/DD
SUMMARY OF INDIVIDUAL HAZARDOUS SUBSTANCE SITES
LOCATION AND HAZARD SUMMARY BY IHSS

OU	IHSS	LOCATION	DESCRIPTION
13	186	Valve Vault west of Building 552	Pipe leak - uranium nitrate, plutonium, americium, chloride and sulfate, and oakite.
13	190	Caustic Leak southeast corner of Building 443	A 1,500-gallon sodium hydroxide spill.*
13	191	Hydrogen Peroxide Spill near the intersection of Fifth Street and Central Avenue	Two 55-gallon drums of 35 percent hydrogen peroxide fell from a pallet.*
14	131	Radioactive Site 700 Area Site No. 1, Building 776 gas bottle dock	Explosion that released plutonium. (Small amount of U [ERTSD].)
14	156.1	Radioactive Site Building 334 Parking Lot	Contaminated soil pile - subsequently removed. Before removal, soil samples were 3 to 704 disintegrations per minute per gram.*
14	160	Radioactive Site Building 444 Parking Lot	Storage area for punctured or leaking waste drums and boxes. Uranium, plutonium, PCBs, tetrachloroethylene, carbon disulfide, and 1,1,1-trichloroethane.
14	161	Radioactive Site Area west of Building 664	Punctured or leaking drums and boxes. Americium-241, plutonium, uranium, hydraulic oil, tetrachloroethylene, and other volatile organics.
14	162	Radioactive Site 700 Area Site No. 2 south of Building 771	Unknown source - volatile organics, radionuclides, beryllium, iron, chromium, hexavalent chromium, nitric acid, hydrochloric acid, and fluoride.*

APPENDIX 3.3
INDUSTRIAL AREA IM/IRA/DD
SUMMARY OF INDIVIDUAL HAZARDOUS SUBSTANCE SITES
LOCATION AND HAZARD SUMMARY BY IHSS

OU	IHSS	LOCATION	DESCRIPTION
14	164.1	Radioactive Site 800 Area, No. 2. Concrete Slab, northwest Building 881	Storage of a plutonium-contaminated slab.
14	164.2	Radioactive Site 800 Area, Site No. 2 Building 886 Spills	Spills as a result of movement of contaminated equipment and other activities. Accumulated groundwater in pit is likely uranium-contaminated.
14	164.3	Radioactive Site 800 Area Site No. 2 Buildings 889 Storage	Decontamination facility for uranium-contaminated equipment.
15	178	Building 881 Drum Storage Area	A 5- by 5-foot area located in Room 165, first used in the mid-1950s and is still used for less than 90-day storage. 55-gallon drums containing waste oil that contains hazardous (such as volatile organic compounds) and possibly low-level radioactive wastes have been stored here (ERTSD).*
15	179	Building 865 Drum Storage Area	An 8- by 12-foot area located in Room 145, first used in 1970 and is currently a 90-day accumulation area. 55-gallon drums containing waste oils, chlorinated solvents, and possibly beryllium have been stored here (ERTSD).*
15	180	Building 883 Drum Storage Area	A 10- by 16-foot area located in Room 104, used since 1981 and is currently used for a less than 90-day storage area. 55-gallon drums containing waste oils contaminated with solvents and uranium have been stored here (ERTSD).*
15	204	Original Uranium Chip Roaster	No Information

APPENDIX 3.3
INDUSTRIAL AREA IM/IRA/DD
SUMMARY OF INDIVIDUAL HAZARDOUS SUBSTANCE SITES
LOCATION AND HAZARD SUMMARY BY IHSS

OU	IHSS	LOCATION	DESCRIPTION
15	211	Unit 26, Building 881 Drum Storage Area	No Information
15	212	Unit 63, Building 371 Drum Storage	No Information
15	217	Unit 32, Building 881 Cyanide Bench Scale Treatment	No Information
16	185	Southeast loading dock of Building 707	A 30- by 60-foot area of a 1,1,1-trichloroethane spill from a fork-lift punctured 55-gallon drum (ERTSD).*
16	192	Floor drain of Building 708	An antifreeze discharge from 155 gallons of 25 percent ethylene glycol released from a chiller unit into a floor drain in December 1980. The flow was contained by diverting the storm water discharge into Pond B-1 (ERTSD).*
16	193	400 Area near Building 443	Steam condensate leak containing a low concentration of amines (ERTSD).
16	194	700 Area near Building 707	Steam condensate line break near Building 707. Water from this line flowed through Pond B-4 into Walnut Creek (ERTSD).*
16	195	Onsite south of Lindsay Ranch, northeast of RFP Production area	Cylinders of nickel carbonyl were lowered down a drilled hole where the nickel carbonyl was destroyed. Two cylinders where wedged in the hole and buried in place (ERTSD).

APPENDIX 3.3
INDUSTRIAL AREA IM/IRA/DD
SUMMARY OF INDIVIDUAL HAZARDOUS SUBSTANCE SITES
LOCATION AND HAZARD SUMMARY BY IHSS

OU	IHSS	LOCATION	DESCRIPTION
16	196	South side of Building 124	Backwash from the raw water treatment plant was collected in the unlined pond during the early 1970s. The pond was reported dried up and destroyed in the late 1970s. The area is now paved (ERTSD).
16	197	Southwest of Building 559	Two scrap metal sites used to dispose of nonradioactive, nonhazardous, nonprecious scrap metal. One site may have received used transformers that contained PCBs (ERTSD).

Notes: * See also PCB Sites Table.
Information from: *Integrated Field Sampling Plan* (EG&G 1993a); *Historical Release Report* (EG&G 1992a); *Environmental Restoration Technical Support Document (ERTSD)* (EG&G 1992b).

APPENDIX 3.4
INDUSTRIAL AREA IM/IRA/DD
POLYCHLORINATED BIPHENYL SITES

(intentionally blank)

INDUSTRIAL AREA IM/IRA/DD
PCB SITES

PCB Site	IHSS	LOCATION	DESCRIPTION	CATEGORY
1	203	Near present landfill (not in IA)	55-gallon drums of PCBs were stored here. A spill occurred in this area. An unspecified amount of soil was excavated after the spill.	I
2	117.1	Adjacent to Bldg. 549 and 223	Two transformers (223-1 and 223-2) once leaked small amounts of oil before 1987.	II
3	Near 158 and 117.2	Adjacent to Bldg. 551	Transformer T556 was retrofilled in 1987. It is known to have leaked in the past. Stains on the pool and fresh oil present inside the east panel indicate that it is still leaking.	II
4	Near 181, 156.1, 190, and 191	NW of Bldg. 334	Transformer 334-1. No spills or leaks are known to have occurred.	III
5	Near 157.1 and 191	NE corner of Bldg. 443	Transformer 443-1 replaced a former leaking transformer in area.	II
6	-	Basement of Bldg. 111	Transformer was documented as having leaked before 1987. A drain system within the bermed transformer was sealed in 1987.	II
7	Near 157.2 and 136.2	NW of Bldg. 444	Transformer 444-2. No spills or leaks documented.	III
8	-	Basement of Bldg. 444	There are three drains in the area of the documented spill. One drain has been cemented over.	II

INDUSTRIAL AREA IM/IRA/DD
PCB SITES

PCB Site	IHSS	LOCATION	DESCRIPTION	CATEGORY
9	157.2	Bldg. 447 Roof	Area may have been impacted by surface water runoff contaminated with PCBs. Discharge may have contaminated roof areas, ground, and storm/sewer drains.	II
10	Near 172 and 190	N of 555-558 Substation	Leak around valve of Tranformer 558.	II
11	Near 172 and 190	S of 555-558 Substation	Transformer 555. No spills or leaks are known to have occurred. It is believed to have been retrofilled in 1987.	III
12	Near 172	N of Substation 661-675	Transformer 350-002 shows visible evidence of a leak from a valve on North side. Sample results dated 8/11/91 show high levels (22.49 pCi/g) of plutonium 239/240.	II
13	-	S of 661-675 Substation	Historical records indicate that the transformer leaked before 1987. The transformer was retrofilled in 1987.	II
14	Near 121	*Adjacent to Bldg. 666*	Area was used to store unused and unusable transformers. Numerous spills have occurred at this site in the past.	II
15	180	Bldg. 883 Drum Storage Area	Three transformers and one switch gear may have leaked oil containing PCBs before being retrofilled in 1987.	II

INDUSTRIAL AREA IM/IRA/DD
PCB SITES

PCB Site	IHSS	LOCATION	DESCRIPTION	CATEGORY
16	Near 179	N. of Bldg. 886	Two transformers leaked in the past. The transformers were removed, retrofilled, and moved to another location. The site consists of partial remains of the concrete pads.	II
17	180	Bldg. 883 Drum Storage Area	Transformer 883-4 leaked in the past. The transformer was removed, retrofilled, and moved to another location. The old pad was scarified. The site consists of a partially removed pad.	II
18	178	Bldg. 881 Drum Storage Area	Transformer 881-4 leaked oil containing PCBs before being retrofilled in 1987.	II
19	-	Inside Bldg. 881	Three transformers are separated by enclosed vaults with no drains. A leak was observed above a valve.	II
20	Near 117.1	So. of Substation 515-516	Transformer 516. No evidence of leaks. Retrofilled in 1987.	III
21	Near 150.2	NW corner of Bldg. 776	Transformer is suspected to have leaked. It was removed and the transformer pad has been partially removed.	II
22	Near 150.2 and 162	SW corner of Bldg. 776	Transformer 370-055 may have leaked from a valve before being retrofilled in 1987.	II
23	Near 150.2, 159, and 162	Adjacent to Bldg. 559	Transformer 559-1 leaked oil containing PCBs from a valve before being retrofilled in 1987 and relocated to another area.	II

INDUSTRIAL AREA IM/IRA/DD
PCB SITES

PCB Site	IHSS	LOCATION	DESCRIPTION	CATEGORY
24	Near 150.5, 147.1, and 121	W of Bldg. 708	Four transformers were moved and retrofilled in 1987. Two of them leaked oil containing PCBs from valves.	II
25	Near 185, 192, and 194	E of Bldg. 707	Documented evidence of a PCB-contaminated oil leak from Transformer 707-1 which is located on the roof of Bldg. 707. Roof and soil adjacent to Bldg. 707 are contaminated.	I
26	150.4 Near 214 and 150.6	N of Bldg. 750	Transformer 750-1 leaked PCBs before being relocated to a new pool several feet east of its original location and retrofilled in 1987.	II
27	-	Inside Bldg. 771	A leak occurred here. The transformer was removed, samples collected, the area decontaminated, and the pad encapsulated.	I
28	-	S of Bldg. 771	Transformer 714-1. No historical evidence of leaks.	III
29	Near 138, 150.8, and 121	N of Bldg. 779	Two transformers (779-1 and 779-2) leaked oil containing PCBs before being retrofilled in 1987 and relocated.	II
30	Adjacent to 173, near 192	E of Bldg. 991	Documented evidence of leaks from Transformer 991-1 and 991-2 before being retrofilled in 1987. Appeared to be leaking in 1991.	II

INDUSTRIAL AREA IM/IRA/DD
PCB SITES

PCB Site	IHSS	LOCATION	DESCRIPTION	CATEGORY
31	Near 150.1, 139.1, 139.2, 163.1, and 163.2	NW of Solar Ponds	Elevated concentrations of PCBs were detected in sediment samples collected in a ditch located about 400 feet NW of the Solar Ponds (Station SED 124).	I
32	Near IHSS 117.1	N of Substation 515-516	No evidence of past or present leaking oil	III
33	Near 151 and 206	N of Bldg. 371	Six transformers may have leaked before being retrofilled in 1987. One transformer was leaking in 1991.	II
34	-	Inside of Bldg. 371	No berm, no sewer drains or lines in vicinity.	III
35	-	E of Bldg. 374	Seventeen 55-gallon drums of PCB-contaminated oil were temporarily stored here in 1980 for EPA. They were removed in 1982.	III
36	-	South of Bldg. 443	PCB contamination found in soils. Soils were remediated in summer of 1993.	-

Category I - Known Releases
Category II - Suspected Releases
Category III - Potential Releases

Information from the *Historical Release Report* (EG&G 1992f) and the *Assessment of Known, Suspect and Potential Environmental Releases of Polychlorinated Biphenyls* (EG&G 1991e)

Note: The PCB site locations are currently being investigated. Some PCB information in the 1992 HRR may be incorrect. Sample results from PCB locations are available from EG&G Environmental Management Division.

APPENDIX 3.5
INDUSTRIAL AREA IM/IRA/DD
UNDER-BUILDING CONTAMINATION

(Taken From the Historical Release Report, EG&G 1992a)

3.14 Under Building Contamination

PAC Reference Number: See below

IHSS Reference Number: Not Applicable

Unit Name: Under Building Contamination (UBC)

The following buildings are proposed to be UBCs. The PAC reference number for these sites is UBC with the building number. For example, UBC-122 indicates that Building 122 is considered a Potential Area of Concern due to possible under building contamination.

Building 122 (UBC-122)
Building 123 (UBC-123)
Building 125 (UBC-125)
Building 331 (UBC-331)
Building 371 (UBC-371)
Building 374 (UBC-374)
Building 439 (UBC-439)
Building 440 (UBC-440)
Building 441 (UBC-441)
Building 442 (UBC-442)
Building 444 (UBC-444)
Building 447 (UBC-447)
Building 528 (UBC-528)
Building 559 (UBC-559)
Building 701 (UBC-701)
Building 707 (UBC-707)
Building 731 (UBC-731)
Building 770 (UBC-770)
Building 771 (UBC-771)
Building 774 (UBC-774)
Building 776 (UBC-776)
Building 777 (UBC-777)
Building 778 (UBC-778)
Building 779 (UBC-779)
Building 865 (UBC-865)
Building 881 (UBC-881)
Building 883 (UBC-883)
Building 886 (UBC-886)
Building 887 (UBC-887)
Building 889 (UBC-889)
Building 991 (UBC-991)

Approximate Location: RFP 400-acre manufacturing area (see Figure UBC-1)

Date(s) of Operation or Occurrence

Variable, but the range is from 1952 to present.

Description of Operation or Occurrence

Soil and/or groundwater beneath the identified buildings may have become contaminated because of the nature of the activities within these buildings. Numerous indoor unplanned events and routine operations may have led to under building contamination. These events are not all similar in nature or scope. Some of these unplanned events have involved extremely small spills of hazardous materials (such as that of a reagent bottle in a laboratory) while others have been major industrial accidents (such as the 1969 fire in Building 776 and Building 777). In addition to these identifiable events, there is also the possibility of routine operations contributing to under building contamination. For example, leaking process waste lines could contribute to under building contamination. Leakage from such lines is generally cleaned up upon its identification, but at times the affected environment is under a building and is not remediated. Tanks associated with these buildings may have leaked or may have been overfilled causing a release to the environment. Building sumps, floors, and foundation wall may have cracks or be otherwise unsealed and have created a pathway for contamination of the environment beneath the building.

Some of the events that may have led to under building contamination are listed below. This list is not intended to be complete, it is rather intended to be representative of the types of events that have occurred which may have led to under building contamination.

Building	Description
122	This building houses the Medical Facility. Use of this building began in 1952.
	This building operated with a 55-gallon drum to receive liquid waste located immediately outside the building. Rusting of this drum and subsequent leakage resulted in some low-level infiltration of the soil under the building and the removal of a section of floor.[1]
123	This building houses the majority of the Health Physics operations. Use of this building began in 1953.
	Waste chemicals from the laboratory, such as a nitric acid mixed with ether incident in December 1953, were sometimes disposed of out the window during the early years of plant operation.[2] This activity could lead to the presence of nonradioactive pollutants under the building.
	The Health Physics Laboratory generates low-level radioactive liquid waste and chemical waste. Known or suspected underground waste line leakage has contributed some material to the soil beneath the building.[1]
371	This building houses the new Plutonium Recovery Facility. Use of this building began in 1981.

Maintenance personnel discovered approximately fifty-five gallons of waste water on the floor of Room 2217 on August 2, 1989.[3] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-011).

A RCRA inspection of a 90-day accumulation area located in Room 3811 revealed that a metal 55-gallon drum containing dilute sulfuric acid solution had ruptured on December 20, 1989.[4] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-023).

374 This building houses a process waste treatment system. Limited use of this building began in the late 1970s.

A solution of 40% dissolved nitrate salt overflowed Tank D-883-B in Room 3809 on June 15, 1989, and ran into the process waste floor drains.[5] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-008).

Process solution filled a glove box in Room 3801, pushed out a window of the box, and approximately 50 gallons spilled onto the floor on November 23, 1989.[6] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-021).

Approximately 100 gallons of process waste solution leaked from a pump in Room 3810 and drained through a process floor drain on November 29, 1989.[7] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-022).

Approximately 500 gallons of pH 12.6 solution of hydroxide salt leaked from a tank in Room 4101, some ran through cracks in the concrete floor to a hallway beneath the room.[8] This incident occurred on May 16, 1990, and resulted in the filing of a RCRA Contingency Plan Implementation Report (90-004).

An operator error led to a spill of brine concentrate in Room 3809, the spill was rinsed down the process drains.[9] This incident occurred on September 18, 1990, and resulted in the filing of a RCRA Contingency Plan Implementation Report (90-008).

Due to an inoperative floor drain, 150 gallons of brine concentrate spilled onto the floor of Room 3810.[10] This incident occurred on October 4, 1990, and resulted in the filing of a RCRA Contingency Plan Implementation Report (90-009).

439,440, These buildings house modification and machining facilities, which have, in the past, included materials such as uranium, beryllium, and lithium.

444,447

A May 1960 vacuum collector fire in Building 447 and a December 1962 uranium/beryllium release from Building 444 have impacted much of the 400 Area. Thus, Building 439, Building 440, Building 444, and Building 447 must be considered radioactively infiltrated to some degree, as should the footings and foundations of these buildings.[1]

442 This building is currently a filter test facility, but once had a decontamination laundry located in it. The first use of this building was in 1953.

The soil beneath the building is potentially affected by both radioactive and chemical materials including uranium, beryllium, and enriched uranium from the laundry operations. The soil in the vicinity of this building has also been affected by instances of radioactive release. In December 1963 rag cleaning barrels leaked or spilled. Liquid drained into the ditch on the northwest side of the building. In 1964 the laundry was infiltrated by radioactively contaminated clothing from Building 883.[1]

444 This building houses general fabrication operations. These operations include machining, casting, and other related operations. Use of this building began in 1953.

The sewage treatment plant received a greenish substance which was tracked to Building 444 and an incident involving the overflow of a hazardous waste tank by chromic acid solution on February 22, 1989.[15] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-001).

It was discovered that the continuous flow fabric filter in Room 1 was overflowing. Low-level radioactively contaminated liquid spilled onto the floor in the area of the filter.[12] This incident occurred on July 7, 1989, and resulted in the filing of a RCRA Contingency Plan Implementation Report (89-010).

A 65 gallon spill of process waste water occurred in Room 1 at a temporary bypass for a filter.[13] This incident occurred on September 29, 1989, and resulted in the filing of a RCRA Contingency Plan Implementation Report (89-014).

Approximately 2,000 gallons of process waste water leaked from a fume scrubber tank in Room 204 on October 25, 1989.[14] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-017)

Water used in the suppression of a fire in Room 245 flooded the floor and several baths containing gold cyanide plating solution, sulfuric acid, hydrochloric acid, and nickel. The water then through floor drains and overflowed waste tanks in rooms 9, 10, and 11.[15] This incident occurred on May 21, 1990. A RCRA Contingency Plan Implementation Report (90-005) was filed on this incident.

559 This building houses the plutonium analytical laboratory. Use of this building began in 1968.

The Service Laboratory Facility was originally built with Pyrex glass waste lines in 1968. Less than a year after construction a break was discovered. In 1972, PVC pipe was installed as a replacement, Vertical core sections taken beneath the building confirmed some infiltration.[1]

In May 1977, water in the manhole south of Building 559 was found to contain plutonium contamination.[16]

701 Building 701 is a maintenance shop.

Process waste backed up into a stool and sink.[1]

707 This building houses general fabrication and assembly operations for plutonium. Use of this building began in 1972.

When Building 707 was being built, excavation of the area revealed that the process waste drain from Building 881 had badly corroded with resultant leaks.[17]

731 This building houses process waste tanks for Bulding 707.

On August 28, 1991 the process waste tanks overflowed 750 gallons of process waste to the secondary containment.[18] Although this single event should not have impacted the environment, over the course of operations of Building 707 the possibility exists that the soils near Building 731 have become infiltrated.

770 This building houses waste storage facilities. Use of this building began in 1965.

In August, 1972, a punctured scrap box and drum resulted in up to 200,000 dpm/100 square centimeters and around the building.[1]

771 This building has housed the primary plutonium and americium recovery operations. This building has also had various other operations housed in it. Use of this building began in 1953.

Trichloroethylene was used in October 1957 to clean and prepare concrete floors.[2]

A fire in 1957 resulted in some environmental infiltration along the edges of the building.[1]

A sewer line break in May 1968 at Building 771 resulted in a sewage lift station tank overflow with the release of low level radioactive and chemical materials to the Building 771 outfall.[1]

Construction excavation in September 1971 between Building 771 and Building 774 exposed tunnel which contains a process waste line. The exposed cracks in the tunnel were sealed and eight drums of soil were removed for off-site disposal in January 1972.[1]

During the routine inspection and servicing of Tank #469 in Room 149, plutonium contaminated nitric acid flowed from a port into a pen and onto the floor.[19] This incident occurred April 13, 1989, and resulted in the filing of a RCRA Contingency Plan Implementation Report (89-004).

774 This building houses a liquid process waste treatment system. Use of this building began in 1953.

In October 1956 a process waste tank overflowed. There was some minor environmental infiltration.[1]

In August 1957 leaking process waste tanks resulted in minor environmental infiltration.[1]

In May 1979 the original Building 774 footing drain was located. It had rusted through on the bottom side.[20]

In October 1975, during excavation for a new sump pump (SP-102-2) in Room 102, contaminated soil with over 1.5 M (1,500,000) disintegrations per minute was encountered.[21] A water sample collected on October 30, 1975, from the floor of Room 102 revealed 35,000 counts per minute.[22]

776 This building houses general plutonium fabrication and foundry operations. Use of this building began in 1957.

A fire on May 11, 1969 released plutonium to all of Building 776 and Building 777 and areas of Building 771, Building 778, and Building 779.[1]

In June 1964 a glove box explosion resulted in an extensive release of plutonium to the interior and exterior of the building.[1]

In October 1964 a tagged out valve was opened allowing contaminated carbon tetrachloride to overflow a lathe box and flow through a crack in the floor, contaminating the room below.[2]

On October 23, 1989, personnel in the Non-Destructive Analyses group noticed a liquid from the process waste tanks T-1A&B and T-2A&B on the floor and in the bermed area.[23] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-016).

779 This building houses general plutonium research and development activities. Use of this building began in 1965.

Building 779 was erected over the site of one of the original solar evaporation ponds. During excavation in September 1962, radioactive readings from 11-75 dpm/l were noted, and later, pools of water in these excavations reached levels of 150 dpm/l. The radioactive material involved was mostly uranium.[1]

In June 1969 an improperly opened waste drum resulted in the spread of radioactive material throughout the building and adjacent grounds.[1]

881 Building 881 currently houses primarily laboratory and office support operations. Various other operations have been conducted in this building such as uranium recovery, machining, and fabrication. Use of this building began in 1953.

Waste lines have been broken with probable infiltration of the soil.[1]

883 This building houses general rolling, forming, and forging operations. Use of this building began in 1957.

On October 27, 1989, process waste water was noted to be overflowing from a tank in Room 139, some of the water flowed under the wall.[24] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-018).

887 This building houses process waste and sanitary waste holding tanks. Use of this building began in 1953.

On September 21, 1989, a utility worker discovered that the process waste tanks had over-flowed on to the floor with excess water from the acid scrubbers in room 266.[25] This incident resulted in the filing of a RCRA Contingency Plan Implementation Report (89-013)

991 This building currently houses storage, non-destructive testing, and metallography operations. Various other operations have been conducted in this building in the past such as assembly of some parts, laboratory work, and shipping and receiving. (Although identified as UBC-991, this UBC is also considered to include the associated storage vaults - Building 996, Building 997, Building 998, and Building 999 - and is identified as such on the map).

It was stated that trace uranium and plutonium infiltration of soils under Building 991 was possible, although concentrations of uranium might be undetectable.[1] Also, according to CEARP Phase 1, routine surveys of the vaults associated with Building 991 have indicated that they are free of radioactive contamination, with the exception of tunnel 996 which might be slightly uranium infiltrated.[26]

In addition to the information available on specific events in or near buildings that may have led to under building contamination, there are also data that indicate the presence of contamination under buildings. These data were generated as a part of routine environmental monitoring, or generated in response to some specific activity or event. Footing drain and building sump data provide indications of possible under building contamination when some analytical parameters in the water from the footing or building sump are present in elevated concentrations. The water from footing drain and building sumps has historically been analyzed for total dissolved solids, conductivity, nitrate nitrogen, pH, gross alpha activity, gross beta activity, and tritium activity. Footing drains and building sumps for which elevated concentrations of some contaminant or indicator parameter have been noted at least once include: the number one Footing Drain (FD) for Building 371 (FD 371-1), FD 371-2, Building Sump (BS) 444-2, FD 516-1, FD 707-1, BS 707-2, BS 707-3, FD 771-1, FD 774-1, FD 779-1, and BS 887-1.[27,28] More recent analyses indicate that solvents are present in some footing drains and may be present in other footing drains.[29]

Additionally, pipes and other materials may remain with contamination present in them even though the use of the building has changed and that particular pipe may no longer be in use. For instance, Building 331 once handled uranium, and as late as 1977 uranium contamination was found in the building.[30,31]

Physical/Chemical Description of Constituents Released:

These soils may be contaminated with radionuclides, nitrate, solvents, acids, and bases. The most likely contaminants in soils beneath any particular building can be identified through knowledge of the operations conducted in that building and the raw and waste materials associated with those operations. The contaminants suspected under a building should be based on the overall history of the building, not just the current operations. For instance, Building 331 is currently a vehicle maintenance and repair garage and may therefore be expected to have solvents and oil present in soils beneath the building. However, in the past portions of the building were used for uranium operations so that uranium contaminated soils may also be present under the building.[30,31]

Responses to Operation or Occurrence:

A number of RCRA Contingency Plan Implementation Reports have been made in response to inside building events that could contribute to under building contamination. These RCRA Contingency Plan Implementation Reports are numbered in a manner that gives the year and a sequential number for the RCRA Contingency Plan Implementation Reports of that year. The RCRA Contingency Plan Implementation Reports addressing indoor building events are: 89-001, 89-004, 89-008, 89-010, 89-011, 89-013, 89-014, 89-016, 89-017, 89-018, 89-021, 89-022, 89-023, 90-004, 90-005, 90-008, 90-009, and 91-016.

Inside building events have largely been cleaned-up or otherwise addressed without noticeable impacts on the outdoor environment. However, due to the long time frame, history of operations, and difficulty in detecting soil contamination beneath buildings, the soils beneath a number of buildings should clearly be considered PACs.

Fate of Constituents Released to Environment:

No documentation was found detailing the fate of constituents released to the environment.

Comments:

For the purposes of this document the buildings listed under Unit Name have been added to the list of PACs. Some are already addressed as separate PACs. Further information on the drains and underground waste lines can be found in Water Quality Data For Foundations And Building Sumps (Document #1600830).

APPENDIX 3.6
INDUSTRIAL AREA IM/IRA/DD
CHEMICAL INVENTORY

(intentionally blank)

Appendix 3.6

Table A
Industrial Area IM/IRA/DD
List of Chemicals Excluded from the Chemicals of Interest

(These chemicals were excluded because they totaled less than 100 pounds at any particular location.)

Air
Argon
Nitrogen
Liquid Nitrogen
Propane
Treated Water
Influent Water
Domestic Water
Domestic Cold Water
Hydrogen Peroxide
Antifreeze/Coolant
ATF, Mercon/Dexron II
Corrosion Inhibitor
DDO #19
Disc Brake Squeal Silencer
Dixchlor Sodium Hypochlorite
Foamtrol
Elastic Polyether Impression Material
Envirostone Emulsifier
Ethylene Glycol
Fluid, #200
Fluid, #550
Mariko
Lubricant, Way 68
Microsol E-1008 Blue
Oil, Alcaid #60
Oil, Spindura
Oil, Vactra
Polymer, 1192
Process Waste
Propylene Glycol
Raw Sewage
All Regal Oil R&D 68
All Regal Oil R&O 68
Sodium Hydroxide
Sunquench 1021
Tranutex F
Trim Sol
Unisyn #6085 and 6085A
Uncontaminated Wastewater
Velocite Oil

Appendix 3.6
Table B
Industrial Area IM/IRA/DD
Chemicals of Interest

FINAL

BUILDING	CHEMICAL NAME	QUANTITY	STORAGE
123	Dibutyldiethylcarbaramoylphosphonate	1,000 gal.	
123	Methylene chloride	500 gal.	
124	Fuel Oil #2	50 gal.	AST
125	Mercury	215 lb.	Glass Jugs
130	Nitric Acid	714 lb.	
130	Nitric Acid	1,125 lb.	Glass
130	Phosphoric Acid	440 gal.	
218	Nitric Acid	20,000 gal.	AGT
218	Nitric Acid	20,000 gal.	
221W	Fuel Oil #6	783,958 gal.	
224	Fuel Oil #6	1,900,000 gal.	AST
224	Fuel Oil #6	1,890,000 gal.	AST
331	Diesel Blend #2 60% #1 40%	6,000 gal.	UST
331	Gasoline	24,800 gal.	UST
371	Solvent Mineral Spirits	55 gal.	
372A	Diesel Fuel	138 gal.	
374	Phosphoric Acid 85%	396 gal.	
374	Sulfamic Acid	200 lb.	
374	Hydrochloric Acid	100 gal.	
374	Nitric Acid	31,432 gal.	
374	Sodium Hydroxide	13,813 gal.	STL Drum
444	1,1,1-Trichloroethane	120 lb.	Fiber Drum
444	Oakite 162	500 lb.	Fiber Drum
444	Oakite Concentrate	190 lb.	Fiber Drum
444	Oakite 160	500 lb.	AST
549	Freon 12	24 gal.	
551	Oakite Aluminum Cleaner NST	360 gal.	ST Drum
551	1,1,2-Trichlorotrifluoroethane	4,140 lb.	

Appendix 3.6
Table B
Industrial Area IM/IRA/DD
Chemicals of Interest

FINAL

BUILDING	CHEMICAL NAME	QUANTITY	STORAGE
559	Diesel Fuel	1,000 gal.	UST
562	Diesel Fuel	3,000 gal.	UST
61	Tremlastic	400 gal.	
707	Carbon Tetrachloride	10,440 gal.	AST
709	Diesel Fuel	8,400 gal.	UST
709	Diesel Blend	4,000 gal.	UST
715	Diesel Fuel	5,260 gal.	UST
727	Diesel Fuel	3,000 gal.	UST
771	Nitric Acid 12N	600 gal.	UST
771	Nitric Acid .35N	210 gal.	UST
771	Potassium Hydroxide	5,500 gal	AST
771	Sulfuric Acid	440 lb.	Containers
771	Lewatit MP, #500	1,770 lb.	Fiber Drum
771	Lewatit Ump, #950	1,202 lb.	Fiber Drum
771	Nitric Acid 7N	210 gal.	UST
771	Fuel Oil	5,600 gal.	AST
776	Trichlorotrifluoromethane	1,380 lb.	Steel Drum
776	Diesel Fuel	5,000 gal.	UST
779	Diesel Fuel	560 gal.	AST
881	Diesel Fuel	5,000 gal.	UST
891	Hydrochloric Acid	2,159 gal.	UST
891	Sodium Hydroxide	1,144 gal.	AST
989	Diesel Fuel	3,000 gal.	UST
T221W	Fuel Oil #6	783,958 gal.	AST
707	Solvent III	5,400 lb.	
551	Freon 11	270 gal.	
551	1,1,2-Trichloro-1,2,2-Trifluoroethane	1,380 lb.	
663	Cleaner, Freon TF	110 gal.	
707	Trichloroethane	600 gal.	

FINAL

APPENDIX 3.7

INDUSTRIAL AREA IM/IRA/DD

SUPPLEMENT TO 1993

TIER II REPORT

Tier Two Emergency and Hazardous Chemical Inventory	U.S. Department of Energy Rocky Flats Plant EG&G Rocky Flats, Inc. Section 2, Range 70W, Township 2S Golden, Jefferson County, CO 80402 SIC Code 3489 Dun & Brad Number 61 605 1538	Owner/Operator U.S. Department of Energy Mail Address P.O. Box 928, Golden, CO 80402-0928 Co-Operator EG&G Rocky Flats, Inc. Phone 303-966-7000 Mail Address P.O. Box 464, Golden, CO 80402-0464
Specific Information By Chemical	FOR OFFICIAL USE ONLY ID # DATE RECEIVED	EMERGENCY CONTACT NAME SHIFT SUPERINTENDENT *24 HOURS* PHONE (303)-966-2914

Reporting Period From January 1 to December 31, 1993

SUPPLEMENT TO 1993 TIER II REPORT

Certification *(Read and sign after completing all sections)*

I certify under penalty of law that I have personally examined and am familiar with the information submitted in pages one through 54, and that based on my inquiry of those individuals responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Print Name T.G. Hedahl Title Associate General Manager Environmental and Waste Management EG&G Rocky Flats Inc. Signature ______________ Date 2/___/1994

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: [ ] Pure [X] Mix

Chemical Name: #2 DIESEL FUEL

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[ ] Immediate (acute)
[ ] Delayed (chronic)

Inventory

05	Maximum Daily Amount (code)
05	Average Daily Amount (code)
365	Number of Days On-site (days)

Container Type: B | Temperature: 4 | Pressure: 1 | Storage Locations: 443, 371, 881, 771, 779, 883

Tier Two
Emergency and Hazardous Chemical Inventory
Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address: U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address: EG&G Rocky Flats, Inc. Phone 303-966-7000, P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 7550-35-8 [ ] Pure [X] Mix

Chemical Name: #2 FUEL OIL

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[ ] Immediate (acute)
[ ] Delayed (chronic)

Inventory

03 Maximum Daily Amount (code)
03 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type B Temperature 4 Pressure 1 Storage Locations 559, 881/S-A

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 ***24 HOURS***

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS [ ] [ ] Pure [X] Mix

Chemical Name: #6 DIESEL FUEL

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[ ] Immediate (acute)
[ ] Delayed (chronic)

Inventory

05	Maximum Daily Amount (code)
05	Average Daily Amount (code)
365	Number of Days *On-site* (days)

Container Type A Temperature 4 Pressure 1 Storage Locations 443

Tier Two
Emergency and Hazardous Chemical Inventory
Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS [ ] Pure [X] Mix

Chemical Name: #6 FUEL OIL

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[ ] Immediate (acute)
[ ] Delayed (chronic)

Inventory

07 Maximum Daily Amount (code)
07 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	221, 224
B	4	1	881/S-A

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: 71-55-6 [X] Pure [ ] Mix

Chemical Name: 1,1,1-TRICHLOROETHANE

EHS Name:

[ ] Solid [X] Liquid [ ] Gas [ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

Maximum Daily Amount (code)	04
Average Daily Amount (code)	04
Number of Days On-site (days)	365

Container Type	Temperature	Pressure	Storage Locations
A	4	1	441/1, 707
D	4	1	440/113, 460/158, 551, 125/125,707/200
F	4	1	881/267
M	4	1	881, 559/101, 371/3112, 771/452
N	4	1	777/415, 779/228, 881/137, 374, 701
M	4	1	559/101

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address: U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address: EG&G Rocky Flats, Inc. **Phone** 303-966-7000, P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS [ ] [X] Pure [ ] Mix

Chemical Name: AIR

EHS Name:

[ ] Solid
[ ] Liquid
[X] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[X] Sudden Release of Pressure
[ ] Reactivity
[ ] Immediate (acute)
[ ] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type L Temperature 4 Pressure 2 Storage Locations 371, 559, 881, 125, 552, 707/127, 991/155,444, 779/272

Tier Two Emergency and Hazardous Chemical Inventory	U.S. Department of Energy Rocky Flats Plant EG&G Rocky Flats, Inc. Section 2, Range70W, Township 2S Golden, Jefferson County, CO 80402	Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Specific Information By Chemical	SIC Code 3489 Dun & Brad Number 61 605 1538	Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY — ID #: ; DATE RECEIVED:

EMERGENCY CONTACT
NAME: SHIFT SUPERINTENDENT
PHONE: (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: 7664-41-7 [X] Pure [X] Mix

Chemical Name: AMMONIA

EHS Name: AMMONIA

[ ] Solid [X] Liquid [X] Gas [X] EHS

Physical And Health Hazards

[ ] Fire
[X] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

03 Maximum Daily Amount (code)
03 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
L	4	2	559/103, 552 GAS HOUSE, 371/2306, 460/142B, 444
N	4	1	701/101, 779, 559
R	4	1	778/100, 551, 371/2202, 449
F	4	1	371, 374/3811, 460, 779, 778/110, 776, 889/104, 707/115, 991, 440/113, 885, 551, 968, 559,777
E	4	1	333, 551

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 | 605 | 1538

Owner/Operator Mail Address: U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address: EG&G Rocky Flats, Inc. Phone 303-966-7000, P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME: SHIFT SUPERINTENDENT
PHONE: (303)-966-2914 *24 HOURS*

Reporting Period: From January 1 to December 31, 1993

Chemical Description

CAS: 7440-37-1 [X] Pure [X] Mix

Chemical Name: ARGON

EHS Name:

[ ] Solid
[X] Liquid
[X] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[X] Sudden Release of Pressure
[ ] Reactivity
[X] Immediate (acute)
[ ] Delayed (chronic)

Inventory

05 Maximum Daily Amount (code)
05 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	2	771, 776, 445, 707, 334, 371, 446, 779, 881, 777, 865, 883, 460, 559
L	4	2	883/105,378,371,334,223,779,559,778,125,374,440,444,549,552,460,663,705,707,708,776,777,865,881,980,991,T881S,566,790,230/36
C	4	2	460/151E

Tier Two
Emergency and Hazardous Chemical Inventory
Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 10043-35-3 [X] Pure [ ] Mix

Chemical Name: BORIC ACID

EHS Name:

[X] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
E	4	1	374/CHEM-PREP
J	4	1	551, 771, 883/104, 374/CHEM PREP
K	4	1	444/201
M	4	1	777/415, 779/139, 779/140, 881, 444/201, 559, 371/3408, 123/112
N	4	1	374, 779/139, 881, 707, 559/102, 444, 123, 776/159A2
D	4	1	374/CHEMPREP
A	4	1	374/4104

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address: U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address: EG&G Rocky Flats, Inc. Phone 303-966-7000, P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME: SHIFT SUPERINTENDENT
PHONE: (303)-966-2914 *24 HOURS*

Reporting Period: From January 1 to December 31, 1993

Chemical Description

CAS: 1306-19-0 [X] Pure [ ] Mix

Chemical Name: CADMIUM OXIDE

EHS Name: CADMIUM OXIDE

[X] Solid
[ ] Liquid
[ ] Gas
[X] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

03 Maximum Daily Amount (code)
03 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
F	4	1	444/204
M	4	1	881, 559/101D
R	4	1	880,886

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: 10043-52-4 [X] Pure [ ] Mix

Chemical Name: CALCIUM CHLORIDE

EHS Name:

[X] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

04	Maximum Daily Amount (code)
04	Average Daily Amount (code)
365	Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	374
I	4	1	779
J	4	1	968, 774
M	4	1	123, 701/101, 779, 559/102, 776/159A2, 881, 551,779
N	4	1	779, 444, 881, 701/101
F	4	1	779
K	4	1	779, 061
R	4	1	779/131, 061, 444/201

Tier Two Emergency and Hazardous Chemical Inventory *Specific Information By Chemical*	U.S. Department of Energy Rocky Flats Plant EG&G Rocky Flats, Inc. Section 2, Range70W, Township 2S Golden, Jefferson County, CO 80402 SIC Code 3489 Dun & Brad Number 61 605 1538	Owner/Operator Mail Address: U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928 Co-Operator Mail Address: EG&G Rocky Flats, Inc. Phone 303-966-7000, P.O. Box 464, Golden, CO 80402-0464
FOR OFFICIAL USE ONLY	ID # DATE RECEIVED	**EMERGENCY CONTACT** NAME SHIFT SUPERINTENDENT PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description		Physical And Health Hazards	Inventory
CAS 124-38-9 [X] Pure [ ] Mix Chemical Name: CARBON DIOXIDE EHS Name:	[ ] Solid [X] Liquid [X] Gas [ ] EHS	[ ] Fire [X] Sudden Release of Pressure [ ] Reactivity [X] Immediate (acute) [X] Delayed (chronic)	04 Maximum Daily Amount (code) 04 Average Daily Amount (code) 365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	2	865, LOC10
L	4	2	125, 779, 552, 444, 881, 663, 551/107, 778, 440/105, 707/220, 881, 980, 777, 125/111

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 ***24 HOURS***

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 56-23-5 [X] Pure [ ] Mix

Chemical Name: CARBON TETRACHLORIDE

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

04	Maximum Daily Amount (code)
04	Average Daily Amount (code)
365	Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	707
M	4	1	460, 708, 559/101, 779/131,707/135, 701,771/137,881, 371

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

FOR OFFICIAL USE ONLY: ID # / DATE RECEIVED

Owner/Operator Mail Address	U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000, P.O. Box 464, Golden, CO 80402-0464

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS [ ] Pure [ ] Mix [X]

Chemical Name: CEMENT

EHS Name:

[X] Solid [X] Liquid [ ] Gas [ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

05 Maximum Daily Amount (code)
05 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
D	4	1	371
E	4	1	883/3,374/4801
F	4	1	881/267, 440/106, 968, 559, 061, 551
I	4	1	374/3810
J	4	1	447/501, 551, 374, 774, 566
N	4	1	374/3811, 551
R	4	1	771
A	4	1	779/139
M	4	1	374,779
H	4	1	374

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 7782-50-5 [X] Pure [ ] Mix

Chemical Name: CHLORINE

EHS Name: CHLORINE

[ ] Solid
[ ] Liquid
[X] Gas
[X] EHS

Physical And Health Hazards

[ ] Fire
[X] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

03	Maximum Daily Amount (code)
03	Average Daily Amount (code)
365	Number of Days On-site (days)

Container Type L Temperature 4 Pressure 2 Storage Locations 124, 552, 995, 371/18, 777

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 67-66-3 [X] Pure [ ] Mix

Chemical Name: CHLOROFORM

EHS Name: CHLOROFORM

[ ] Solid
[X] Liquid
[ ] Gas
[X] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

03 Maximum Daily Amount (code)
03 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
D	4	1	559
M	4	1	559/103,881,779,449/MTCE-CARP,776/134

Tier Two Emergency and Hazardous Chemical Inventory *Specific Information By Chemical*	U.S. Department of Energy Rocky Flats Plant EG&G Rocky Flats, Inc. Section 2, Range70W, Township 2S Golden, Jefferson County, CO 80402 SIC Code 3489 Dun & Brad Number 61 605 1538	Owner/Operator Mail Address: U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928 Co-Operator Mail Address: EG&G Rocky Flats, Inc. Phone 303-966-7000, P.O. Box 464, Golden, CO 80402-0464
	FOR OFFICIAL USE ONLY — ID # ; DATE RECEIVED	**EMERGENCY CONTACT** NAME SHIFT SUPERINTENDENT PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description	Physical And Health Hazards	Inventory
CAS 10025-73-7 [X] Pure [ ] Mix	[ ] Fire	[01] Maximum Daily Amount (code)
Chemical Name: CHROMIC CHLORIDE	[ ] Sudden Release of Pressure	[01] Average Daily Amount (code)
EHS Name: CHROMIC CHLORIDE	[ ] Reactivity	[365] Number of Days On-site (days)
[X] Solid [ ] Liquid [ ] Gas [X] EHS	[X] Immediate (acute) [X] Delayed (chronic)	

Container Type [M] Temperature [4] Pressure [1] Storage Locations 123/157, 779/139, 881

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address: U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address: EG&G Rocky Flats, Inc. Phone 303-966-7000, P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME: SHIFT SUPERINTENDENT
PHONE: (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: [ ] Pure [X] Mix

Chemical Name: DIESEL BLEND

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[ ] Immediate (acute)
[ ] Delayed (chronic)

Inventory

05 Maximum Daily Amount (code)
05 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	127, 120, 331
B	4	1	124, 709, 771

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME: SHIFT SUPERINTENDENT

PHONE: (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: [ ] Pure [X] Mix

Chemical Name: DIESEL FUEL

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[ ] Immediate (acute)
[ ] Delayed (chronic)

Inventory

05	Maximum Daily Amount (code)
05	Average Daily Amount (code)
365	Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	T762A, 060, 928, T771B, 709, 711, 729, 566, 777, 827, 920, 708, 562, 727, 776, 715, 771, 881, T427A, T372A, T792A, 427,928, 716, T900D, 989
B	4	1	881, 989

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 60-00-4 [X] Pure [ ] Mix

Chemical Name: EDTA

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)

04 Average Daily Amount (code)

365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	2	910
M	4	1	881/266
N	4	1	371/3412, 559/102

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range 70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator	U.S. Department of Energy
Mail Address	P.O. Box 928, Golden, CO 80402-0928
Co-Operator	EG&G Rocky Flats, Inc. Phone 303-966-7000
Mail Address	P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: [ ] Pure [X] Mix

Chemical Name: EPOXY PAINT

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[ ] Immediate (acute)
[X] Delayed (chronic)

Inventory

04	Maximum Daily Amount (code)
04	Average Daily Amount (code)
365	Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
F	4	1	881/267, 371/3160, 381, 779/131
F	4	2	460/142B

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: 7720-78-7 [X] Pure [ ] Mix

Chemical Name: FERROUS SULFATE

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[ ] Immediate (acute)
[X] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type: C | Temperature: 4 | Pressure: 1 | Storage Locations: 374/4101, 460/141B

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator	U.S. Department of Energy
Mail Address	P.O. Box 928, Golden, CO 80402-0928
Co-Operator	EG&G Rocky Flats, Inc. Phone 303-966-7000
Mail Address	P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 7440-59-7 [ ] Pure [ ] Mix

Chemical Name: HELIUM

EHS Name:

[ ] Solid
[ ] Liquid
[X] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[X] Sudden Release of Pressure
[ ] Reactivity
[X] Immediate (acute)
[ ] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	2	707
L	4	2	779, 559, 777, 881, 371/3412, 125, 552, 123/126, 444, 447/404, 460, 705/100, 778, 865/171, 881, 991/155, 440, 371/18-T
P	4	2	559/103, 460, 779

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS [ ] Pure [ ] Mix [X]

Chemical Name: HYDRAULIC OIL

EHS Name:

Solid [ ] Liquid [X] Gas [ ] EHS [ ]

Physical And Health Hazards

- [X] Fire
- [ ] Sudden Release of Pressure
- [ ] Reactivity
- [ ] Immediate (acute)
- [ ] Delayed (chronic)

Inventory

04	Maximum Daily Amount (code)
04	Average Daily Amount (code)
365	Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	883, 707/200
C	4	1	707, 460/115J
D	4	1	980

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range 70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator	U.S. Department of Energy
Mail Address	P.O. Box 928, Golden, CO 80402-0928
Co-Operator	EG&G Rocky Flats, Inc. Phone 303-966-7000
Mail Address	P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY: ID # | DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 7647-01-0 [X] Pure [ ] Mix

Chemical Name: HYDROCHLORIC ACID

EHS Name:

[ ] Solid [X] Liquid [X] Gas [ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	891
E	4	1	T900D
M	4	1	111/HOPE E, 371, 123, 881, 779, 771, 777/415, 444, 460, 374, 776/159A2, 559, 701, 551, 705/100, 991/110, 774/322 SHED, T891O, T771F, T891N, 865, T900D
N	4	1	701, 778/110, 750/PAD, 559/103, 371, 444, 779, 771/159, 980, T900D, 991/110, T891R, T771F, 777/415, T891N, 881
C	4	1	374
L	4	2	444/203

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address: U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928
Co-Operator: EG&G Rocky Flats, Inc. Phone 303-966-7000
Mail Address: P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 7664-39-3 [X] Pure [X] Mix

Chemical Name: HYDROFLUORIC ACID

EHS Name: HYDROFLUORIC ACID

[ ] Solid [X] Liquid [ ] Gas [X] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

03 Maximum Daily Amount (code)
03 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
E	4	1	771/180D
R	4	2	881/245, 559/101
N	4	1	881, 779, 444, 559, 777/415, 371, 865/106, 776/159A2, 123/111, 551, 771/247
K	4	1	881
A	4	1	714

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range 70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 7722-84-1 [X] Pure [ ] Mix

Chemical Name: HYDROGEN PEROXIDE

EHS Name: HYDROGEN PEROXIDE

[ ] Solid [X] Liquid [ ] Gas [X] EHS

Physical And Health Hazards

[X] Fire
[X] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	891
E	4	1	T900D, 559/101D
M	4	1	T771F, 881
N	4	1	T771F, 703, 123, 444, 771/129B, 881, 779/141B, 865/101, 701/101, 444/245, 123/127
C	4	1	374

Tier Two Emergency and Hazardous Chemical Inventory *Specific Information By Chemical*	U.S. Department of Energy Rocky Flats Plant EG&G Rocky Flats, Inc. Section 2, Range70W, Township 2S Golden, Jefferson County, CO 80402 SIC Code 3489 Dun & Brad Number 61 605 1538	Owner/Operator Mail Address: U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928 Co-Operator Mail Address: EG&G Rocky Flats, Inc. Phone 303-966-7000, P.O. Box 464, Golden, CO 80402-0464
	FOR OFFICIAL USE ONLY ID # DATE RECEIVED	**EMERGENCY CONTACT** NAME SHIFT SUPERINTENDENT PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description		Physical And Health Hazards	Inventory
CAS 7550-35-8 [X] Pure [ ] Mix Chemical Name: KATHENE EHS Name:	[ ] Solid [X] Liquid [ ] Gas [ ] EHS	[ ] Fire [ ] Sudden Release of Pressure [ ] Reactivity [X] Immediate (acute) [ ] Delayed (chronic)	04 Maximum Daily Amount (code) 04 Average Daily Amount (code) 365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
E	4	1	776/208, 061
A	4	1	707/120

Tier Two
Emergency and Hazardous Chemical Inventory
Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 Dun & Brad Number: 61 605 1538

Owner/Operator	U.S. Department of Energy
Mail Address	P.O. Box 928, Golden, CO 80402-0928
Co-Operator	EG&G Rocky Flats, Inc. Phone 303-966-7000
Mail Address	P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: [ ] Pure [X] Mix
Chemical Name: LAST-A-FOAM
EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[ ] Delayed (chronic)

Inventory

03 Maximum Daily Amount (code)
03 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type: D Temperature: 4 Pressure: 1 Storage Locations: T440N, 439/105

Tier Two Emergency and Hazardous Chemical Inventory *Specific Information By Chemical*	U.S. Department of Energy Rocky Flats Plant EG&G Rocky Flats, Inc. Section 2, Range 70W, Township 2S Golden, Jefferson County, CO 80402 SIC Code 3489 Dun & Brad Number 61 605 1538	Owner/Operator Mail Address: U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928 Co-Operator Mail Address: EG&G Rocky Flats, Inc. Phone 303-966-7000, P.O. Box 464, Golden, CO 80402-0464
	FOR OFFICIAL USE ONLY ID # DATE RECEIVED	EMERGENCY CONTACT NAME SHIFT SUPERINTENDENT PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description		Physical And Health Hazards	Inventory
CAS 7447-41-8 [X] Pure [ ] Mix Chemical Name: LITHIUM CHLORIDE EHS Name:	[X] Solid [X] Liquid [ ] Gas [ ] EHS	[ ] Fire [ ] Sudden Release of Pressure [ ] Reactivity [X] Immediate (acute) [X] Delayed (chronic)	04 Maximum Daily Amount (code) 04 Average Daily Amount (code) 365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
M	4	1	123/157, 779, 881
N	4	1	865/148
R	4	1	T707B, 061
F	4	1	779/B1

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: 7487-88-9 [X] Pure [ ] Mix

Chemical Name: MAGNESIUM SULFATE

EHS Name:

[X] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[X] Sudden Release of Pressure
[ ] Reactivity
[ ] Immediate (acute)
[ ] Delayed (chronic)

Inventory

Maximum Daily Amount (code)	04
Average Daily Amount (code)	04
Number of Days On-site (days)	365

Container Type	Temperature	Pressure	Storage Locations
A	4	1	374
F	4	1	701/101
M	4	1	371/3408, 881, 779/139
N	4	1	881/227, 444/201, T452F, 371/3412

Tier Two Emergency and Hazardous Chemical Inventory
Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY: ID # / DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 21908-53-2 [X] Pure [ ] Mix

Chemical Name: MERCURIC OXIDE

EHS Name: MERCURIC OXIDE

[X] Solid
[X] Liquid
[ ] Gas
[X] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	374
M	4	1	779/139, 881, 559/101D

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

Owner/Operator Mail Address: U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address: EG&G Rocky Flats, Inc. Phone 303-966-7000, P.O. Box 464, Golden, CO 80402-0464

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 7697-37-2 [X] Pure [X] Mix

Chemical Name: NITRIC ACID

EHS Name: NITRIC ACID

[ ] Solid
[X] Liquid
[X] Gas
[X] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

05 Maximum Daily Amount (code)

05 Average Daily Amount (code)

365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	218, 374, 883/139, 460/142B, 218
E	4	1	T900D, 444/137, 705, 883/108, 865/144
M	4	1	444, 460, 881, 123, 779, 559, 701, 883/104, T771F, T891M, T891R, 991, T891D, 865/106, 705/100, T891L, T900D, 371, T8910, 777, 776/159A2, T891F, T690J,374,910,T771J,T771N
N	4	1	444, T900D, 779, 371/3408, 559/102, 707, 701, 881, 777/415, 776, 551
R	4	1	371/3412, 881/137
D	4	1	444/117, 776/159A1, 061
F	4	1	444/117, 776

APPENDIX 3.8

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

(intentionally blank)

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.19	1115	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.19	1115	SA	A
D001		RES,REM	371	90.2	3606	SA	A
D002		RES,REM	371	90.2	3606	SA	A
D003		RES,REM	371	90.2	3606	SA	A
D004		RES,REM	371	90.2	3606	SA	A
D005		RES,REM	371	90.2	3606	SA	A
D006		RES,REM	371	90.2	3606	SA	A
D007		RES,REM	371	90.2	3606	SA	A
D008	LEAD	RES,REM	371	90.2	3606	SA	A
D009	MERCURY	RES,REM	371	90.2	3606	SA	A
D007		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A
D010	SELENIUM	RES,REM	371	90.2	3606	SA	A
D011	SILVER	RES,REM	371	90.2	3606	SA	A
D019	CARBON TET	RES,REM	371	90.2	3606	SA	A
ENDRIN		RES,REM	371	90.2	3606	SA	A
ENDRIN		RES,REM	371	90.2	3606	SA	A
ENDRIN		RES,REM	371	90.2	3606	SA	A
ENDRIN		RES,REM	371	90.2	3606	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.20	2223	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.20	2223	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.20	2223	SA	A
D004		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.20	2223	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.20	2223	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.20	2223	SA	A
D007		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.20	2223	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.20	2223	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D009	MERCURY	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.20	2223	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.20	2223	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.20	2223	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.20	2223	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.20	2223	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.20	2223	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.20	2223	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.20	2223	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.3	3337	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.3	3337	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.3	3337	SA	A
D004		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.3	3337	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.3	3337	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.3	3337	SA	A
D007		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.3	3337	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.3	3337	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.3	3337	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.3	3337	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.3	3337	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.3	3337	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.3	3337	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.3	3337	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.3	3337	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.3	3337	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.4	3543	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.4	3543	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.4	3543	SA	A
D004		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.4	3543	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.4	3543	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.4	3543	SA	A
D007		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.4	3543	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.4	3543	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.4	3543	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.4	3543	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.4	3543	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.4	3543	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.4	3543	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.4	3543	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.4	3543	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.4	3543	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.5	2207	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.5	2207	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.5	2207	SA	A
D004		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.5	2207	SA	A
ENDRIN		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
ENDRIN		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D001		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D002		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D003		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D004		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D005		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D006		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D007		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D008	LEAD	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D009	MERCURY	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D010	SELENIUM	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D011	SILVER	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D018	BENZENE	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D019	CARBON TET	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D022	CHLOROFORM	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D028	1,4-DICHLOROETHANE	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D029	1,1-DICHLOROETHENE	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
ENDRIN		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
ENDRIN		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
ENDRIN		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
ENDRIN		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
ENDRIN		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
ENDRIN		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
ENDRIN		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
ENDRIN		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
ENDRIN		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.5	2207	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.5	2207	SA	A
D007		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.5	2207	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.5	2207	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.5	2207	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.5	2207	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.5	2207	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.5	2207	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.5	2207	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.5	2207	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.5	2207	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.5	2207	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.6	3321	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.6	3321	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.6	3321	SA	A
D004		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.6	3321	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.6	3321	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.6	3321	SA	A
D007		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.6	3321	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.6	3321	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.6	3321	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.6	3321	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.6	3321	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.6	3321	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.6	3321	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.6	3321	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.6	3321	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.6	3321	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.62	3501	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.62	3501	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.62	3501	SA	A
D004		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.62	3501	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.62	3501	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.62	3501	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D007		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.62	3501	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.62	3501	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.62	3501	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.62	3501	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.62	3501	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.62	3501	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.62	3501	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.62	3501	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.62	3501	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.62	3501	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.63	1210	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.63	1210	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.63	1210	SA	A
ENDRIN		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
ENDRIN		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
ENDRIN		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
ENDRIN		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
ENDRIN		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
ENDRIN		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.13	3515	SA	A
D001		LLW,HAZ,LLM	371	90.142	3408	SA	A
D002		LLW,HAZ,LLM	371	90.142	3408	SA	A
D003		LLW,HAZ,LLM	371	90.142	3408	SA	A
D004		LLW,HAZ,LLM	371	90.142	3408	SA	A
D005		LLW,HAZ,LLM	371	90.142	3408	SA	A
D006		LLW,HAZ,LLM	371	90.142	3408	SA	A
D007		LLW,HAZ,LLM	371	90.142	3408	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D008	LEAD	LLW,HAZ,LLM	371	90.142	3408	SA	A
D009	MERCURY	LLW,HAZ,LLM	371	90.142	3408	SA	A
D010	SELENIUM	LLW,HAZ,LLM	371	90.142	3408	SA	A
D011	SILVER	LLW,HAZ,LLM	371	90.142	3408	SA	A
D018	BENZENE	LLW,HAZ,LLM	371	90.142	3408	SA	A
D019	CARBON TET	LLW,HAZ,LLM	371	90.142	3408	SA	A
D035	MEK	LLW,HAZ,LLM	371	90.142	3408	SA	A
D041	2,4,5-TRICHLOROPHENOL	LLW,HAZ,LLM	371	90.142	3408	SA	A
ENDRIN		LLW,HAZ,LLM	371	90.142	3408	SA	A
ENDRIN		LLW,HAZ,LLM	371	90.142	3408	SA	A
ENDRIN		LLW,HAZ,LLM	371	90.142	3408	SA	A
ENDRIN		LLW,HAZ,LLM	371	90.142	3408	SA	A
ENDRIN		LLW,HAZ,LLM	371	90.142	3408	SA	A
ENDRIN		LLW,HAZ,LLM	371	90.142	3408	SA	A
ENDRIN		LLW,HAZ,LLM	371	90.142	3408	SA	A
D001		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D002		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D003		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D004		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D004		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.63	1210	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.63	1210	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.63	1210	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.63	1210	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.63	1210	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.63	1210	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.19	1115	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.63	1210	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D007		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.63	1210	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.63	1210	SA	A
D005		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D006		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D007		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D018	BENZENE	RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D022	CHLOROFORM	RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D028	1,4-DICHLOROETHANE	RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D029	1,1-DICHLOROETHENE	RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D035	MEK	RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D038	PYRIDINE	RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D040	TRICHLOROETHYLENE	RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D043	VINYL CHLORIDE	RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM,EMT	371	90.10	2202A_B_C	SA	A
D001		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D004		TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
D002		TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A
D002		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D003		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D004		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D005		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D006		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D007		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D018	BENZENE	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D022	CHLOROFORM	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D028	1,4-DICHLOROETHANE	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D029	1,1-DICHLOROETHENE	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D035	MEK	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D038	PYRIDINE	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D040	TRICHLOROETHYLENE	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D043	VINYL CHLORIDE	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA–REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.16	2325	SA	A
D001		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D002		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D003		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D004		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D005		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D006		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D007		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D008	LEAD	RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D009	MERCURY	RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D010	SELENIUM	RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D011	SILVER	RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D018	BENZENE	RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D019	CARBON TET	RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D022	CHLOROFORM	RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D028	1,4–DICHLOROETHANE	RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D029	1,1–DICHLOROETHENE	RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D035	MEK	RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D038	PYRIDINE	RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D040	TRICHLOROETHYLENE	RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
D043	VINYL CHLORIDE	RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
ENDRIN		RES,LAB,TRU,LLW,REM,STD,TRM,LLM	371	90.11	3187B	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.63	1210	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.63	1210	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.63	1210	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.63	1210	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A
D001		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D002		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D003		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D004		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D005		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D006		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D007		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D018	BENZENE	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D022	CHLOROFORM	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D028	1,4-DICHLOROETHANE	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D029	1,1-DICHLOROETHENE	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D035	MEK	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D038	PYRIDINE	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D040	TRICHLOROETHYLENE	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D043	VINYL CHLORIDE	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.70	3602	SA	A
D001		RES,REM,LAB	371	90.71	3511	SA	A
D002		RES,REM,LAB	371	90.71	3511	SA	A
D003		RES,REM,LAB	371	90.71	3511	SA	A
D004		RES,REM,LAB	371	90.71	3511	SA	A
D005		RES,REM,LAB	371	90.71	3511	SA	A
D006		RES,REM,LAB	371	90.71	3511	SA	A
D007		RES,REM,LAB	371	90.71	3511	SA	A
D008	LEAD	RES,REM,LAB	371	90.71	3511	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D009	MERCURY	RES,REM,LAB	371	90.71	3511	SA	A
D010	SELENIUM	RES,REM,LAB	371	90.71	3511	SA	A
D011	SILVER	RES,REM,LAB	371	90.71	3511	SA	A
D019	CARBON TET	RES,REM,LAB	371	90.71	3511	SA	A
ENDRIN		RES,REM,LAB	371	90.71	3511	SA	A
ENDRIN		RES,REM,LAB	371	90.71	3511	SA	A
ENDRIN		RES,REM,LAB	371	90.71	3511	SA	A
ENDRIN		RES,REM,LAB	371	90.71	3511	SA	A
D001		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D002		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D003		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D004		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D005		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D006		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D007		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D001		RES,REM,LAB	371	90.73	3303	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D004		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A
D029	1,1-DICHLOROETHENE	TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
ENDRIN		TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D001		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D002		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D002		RES,REM,LAB	371	90.73	3303	SA	A
D003		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D004		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D005		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D006		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D007		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D018	BENZENE	RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D022	CHLOROFORM	RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D028	1,4-DICHLOROETHANE	RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D029	1,1-DICHLOROETHENE	RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D035	MEK	RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D038	PYRIDINE	RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D040	TRICHLOROETHYLENE	RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D043	VINYL CHLORIDE	RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
ENDRIN		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D003		RES,REM,LAB	371	90.73	3303	SA	A
D004		RES,REM,LAB	371	90.73	3303	SA	A
D005		RES,REM,LAB	371	90.73	3303	SA	A
D006		RES,REM,LAB	371	90.73	3303	SA	A
D007		RES,REM,LAB	371	90.73	3303	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D008	LEAD	RES,REM,LAB	371	90.73	3303	SA	A
D001		RES,REM	371	90.100	STACKER	SA	A
D002		RES,REM	371	90.100	STACKER	SA	A
D003		RES,REM	371	90.100	STACKER	SA	A
D004		RES,REM	371	90.100	STACKER	SA	A
D005		RES,REM	371	90.100	STACKER	SA	A
D006		RES,REM	371	90.100	STACKER	SA	A
D007		RES,REM	371	90.100	STACKER	SA	A
D008	LEAD	RES,REM	371	90.100	STACKER	SA	A
D009	MERCURY	RES,REM	371	90.100	STACKER	SA	A
D010	SELENIUM	RES,REM	371	90.100	STACKER	SA	A
D011	SILVER	RES,REM	371	90.100	STACKER	SA	A
D019	CARBON TET	RES,REM	371	90.100	STACKER	SA	A
ENDRIN		RES,REM	371	90.100	STACKER	SA	A
ENDRIN		RES,REM	371	90.100	STACKER	SA	A
ENDRIN		RES,REM	371	90.100	STACKER	SA	A
ENDRIN		RES,REM	371	90.100	STACKER	SA	A
D001		REM	371	90.104	3305	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D002		REM	371	90.104	3305	SA	A
D003		REM	371	90.104	3305	SA	A
D004		REM	371	90.104	3305	SA	A
D005		REM	371	90.104	3305	SA	A
D006		REM	371	90.104	3305	SA	A
D007		REM	371	90.104	3305	SA	A
D008	LEAD	REM	371	90.104	3305	SA	A
D009	MERCURY	REM	371	90.104	3305	SA	A
D010	SELENIUM	REM	371	90.104	3305	SA	A
D011	SILVER	REM	371	90.104	3305	SA	A
D019	CARBON TET	REM	371	90.104	3305	SA	A
ENDRIN		REM	371	90.104	3305	SA	A
ENDRIN		REM	371	90.104	3305	SA	A
ENDRIN		REM	371	90.104	3305	SA	A
ENDRIN		REM	371	90.104	3305	SA	A
D001		REM	371	90.104	GB-37C	SA	A
D002		REM	371	90.104	GB-37C	SA	A
D003		REM	371	90.104	GB-37C	SA	A
D004		REM	371	90.104	GB-37C	SA	A
D005		REM	371	90.104	GB-37C	SA	A
D006		REM	371	90.104	GB-37C	SA	A
D007		REM	371	90.104	GB-37C	SA	A
D008	LEAD	REM	371	90.104	GB-37C	SA	A
D009	MERCURY	REM	371	90.104	GB-37C	SA	A
D010	SELENIUM	REM	371	90.104	GB-37C	SA	A
D002		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D011	SILVER	REM	371	90.104	GB-37C	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D019	CARBON TET	REM	371	90.104	GB-37C	SA	A
ENDRIN		REM	371	90.104	GB-37C	SA	A
ENDRIN		REM	371	90.104	GB-37C	SA	A
ENDRIN		REM	371	90.104	GB-37C	SA	A
ENDRIN		REM	371	90.104	GB-37C	SA	A
D009	MERCURY	RES,REM,LAB	371	90.73	3303	SA	A
D010	SELENIUM	RES,REM,LAB	371	90.73	3303	SA	A
D011	SILVER	RES,REM,LAB	371	90.73	3303	SA	A
D019	CARBON TET	RES,REM,LAB	371	90.73	3303	SA	A
ENDRIN		RES,REM,LAB	371	90.73	3303	SA	A
ENDRIN		RES,REM,LAB	371	90.73	3303	SA	A
ENDRIN		RES,REM,LAB	371	90.73	3303	SA	A
ENDRIN		RES,REM,LAB	371	90.73	3303	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D004		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D007		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
ENDRIN		TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
ENDRIN		TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
ENDRIN		TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
ENDRIN		TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
ENDRIN		TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
ENDRIN		TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
D043	VINYL CHLORIDE	TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
D040	TRICHLOROETHYLENE	TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
D038	PYRIDINE	TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
D035	MEK	TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
D001		TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
D028	1,4-DICHLOROETHANE	TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
D019	CARBON TET	TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
D018	BENZENE	TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
D011	SILVER	TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
D010	SELENIUM	TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
D009	MERCURY	TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D008	LEAD	TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
D007		TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
D006		TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
D005		TRM,LAB,TRU,STD,REM,RES,LLM,LLW	371	63	3420	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D001		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D004		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D035	MEK	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D007		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D018	BENZENE	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D022	CHLOROFORM	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D028	1,4-DICHLOROETHANE	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D029	1,1-DICHLOROETHENE	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D035	MEK	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D038	PYRIDINE	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D040	TRICHLOROETHYLENE	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D043	VINYL CHLORIDE	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D038	PYRIDINE	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D040	TRICHLOROETHYLENE	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D043	VINYL CHLORIDE	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D003		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D004		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D005		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D006		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D007		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D018	BENZENE	RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D022	CHLOROFORM	RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D028	1,4-DICHLOROETHANE	RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D029	1,1-DICHLOROETHENE	RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D035	MEK	RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D038	PYRIDINE	RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D040	TRICHLOROETHYLENE	RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D043	VINYL CHLORIDE	RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D001		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D002		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D003		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D004		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D005		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D006		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D001		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D002		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D003		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D004		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D005		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D006		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D007		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D008	LEAD	RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D009	MERCURY	RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D010	SELENIUM	RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D011	SILVER	RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D019	CARBON TET	RES,LAB,TRU,LLW	371	90.12	1101	SA	A
ENDRIN		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
ENDRIN		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
ENDRIN		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
ENDRIN		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D007		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D001		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D002		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A
D003		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A
D004		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A
D005		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A
D006		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A
D007		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D001		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D002		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D003		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D004		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D005		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D006		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D007		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D001		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D002		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D003		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D004		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D005		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D006		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D007		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D008	LEAD	RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D009	MERCURY	RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D010	SELENIUM	RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D011	SILVER	RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D019	CARBON TET	RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
ENDRIN		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
ENDRIN		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
ENDRIN		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.19	1115	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.19	1115	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.19	1115	SA	A
D004		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.19	1115	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.19	1115	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.19	1115	SA	A
D007		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.19	1115	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.19	1115	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.19	1115	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.19	1115	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.19	1115	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.19	1115	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.19	1115	SA	A
D007		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
D004		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
D002		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
D001		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
		LLW,LLM,LAB	374	42.28	3809	TA	A
		LLW,LLM,LAB	374	42.78	3803	TA	A
D005		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
ENDRIN		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
ENDRIN		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
D006		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
ENDRIN		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
ENDRIN		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
ENDRIN		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
ENDRIN		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
D011	SILVER	HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
D010	SELENIUM	HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
D009	MERCURY	HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
D008	LEAD	HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
D010	SELENIUM	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D005		LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D002		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D029	1,1-DICHLOROETHENE	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D035	MEK	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D038	PYRIDINE	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D040	TRICHLOROETHYLENE	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D043	VINYL CHLORIDE	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
ENDRIN		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
ENDRIN		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
ENDRIN		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
ENDRIN		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D028	1,4-DICHLOROETHANE	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D001		LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D002		LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D004		LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D019	CARBON TET	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D006		LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D007		LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D008	LEAD	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D009	MERCURY	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D001		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D010	SELENIUM	LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
ENDRIN		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D043	VINYL CHLORIDE	LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D040	TRICHLOROETHYLENE	LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D038	PYRIDINE	LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D035	MEK	LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D029	1,1-DICHLOROETHENE	LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D028	1,4-DICHLOROETHANE	LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D019	CARBON TET	LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D018	BENZENE	LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D011	SILVER	LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
ENDRIN		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D009	MERCURY	LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D008	LEAD	LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D007		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D006		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D005		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D004		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D002		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
ENDRIN		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
ENDRIN		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
ENDRIN		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
ENDRIN		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
ENDRIN		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D001		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D011	SILVER	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D018	BENZENE	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D019	CARBON TET	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D028	1,4-DICHLOROETHANE	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D029	1,1-DICHLOROETHENE	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D035	MEK	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D038	PYRIDINE	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D040	TRICHLOROETHYLENE	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D043	VINYL CHLORIDE	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
ENDRIN		LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D018	BENZENE	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
ENDRIN		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
ENDRIN		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
ENDRIN		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D004		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D005		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D006		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D007		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D008	LEAD	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D009	MERCURY	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D010	SELENIUM	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D011	SILVER	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D043	VINYL CHLORIDE	LLM,HAZ,LLW	444	39.01	10	ST	A
ENDRIN		LLM,HAZ,LLW	444	39.01	10	ST	A
ENDRIN		LLM,HAZ,LLW	444	39.01	10	ST	A
ENDRIN		LLM,HAZ,LLW	444	39.01	10	ST	A
ENDRIN		LLM,HAZ,LLW	444	39.01	10	ST	A
D001		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D029	1,1-DICHLOROETHENE	TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D038	PYRIDINE	TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D040	TRICHLOROETHYLENE	TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D043	VINYL CHLORIDE	TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D019	CARBON TET	TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D006		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D007		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D008	LEAD	TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D009	MERCURY	TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D010	SELENIUM	TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D011	SILVER	TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D018	BENZENE	TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D008	LEAD	LLM,HAZ,LLW	444	39.01	10	ST	A
D040	TRICHLOROETHYLENE	LLM,HAZ,LLW	444	39.01	10	ST	A
D028	1,4-DICHLOROETHANE	TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D004		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
ENDRIN		LLM,HAZ,LLW	444	39.01	10	ST	A
D035	MEK	TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
		LLW,LAB,LLT,NON	444	0	116	NRA	A
		LAB,LLM	444	39.01	1	TA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D002		LLM,HAZ,LLW	444	39.01	10	ST	A
ENDRIN		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
ENDRIN		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
ENDRIN		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
ENDRIN		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
ENDRIN		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
ENDRIN		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D029	1,1-DICHLOROETHENE	LLM,HAZ,LLW	444	39.01	10	ST	A
D001		LLM,HAZ,LLW	444	39.01	10	ST	A
D038	PYRIDINE	LLM,HAZ,LLW	444	39.01	10	ST	A
D004		LLM,HAZ,LLW	444	39.01	10	ST	A
D005		LLM,HAZ,LLW	444	39.01	10	ST	A
D007		LLM,HAZ,LLW	444	39.01	10	ST	A
D005		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D018	BENZENE	LLM,HAZ,LLW	444	39.01	10	ST	A
D019	CARBON TET	LLM,HAZ,LLW	444	39.01	10	ST	A
D028	1,4-DICHLOROETHANE	LLM,HAZ,LLW	444	39.01	10	ST	A
D002		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T-3	ST	A
D035	MEK	LLM,HAZ,LLW	444	39.01	10	ST	A
ENDRIN		LLM,LLW	447	30	510	SA	A
D038	PYRIDINE	LLM,LLW	447	30	510	SA	A
ENDRIN		LLM,LAB	447	6	501	SA	A
D002		LLM,HAZ,LLW	447	39.02	NA	TA	A
D004		LLM,HAZ,LLW	447	39.02	NA	TA	A
D019	CARBON TET	LLM,LLW	447	30	510	SA	A
D028	1,4-DICHLOROETHANE	LLM,LLW	447	30	510	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D029	1,1-DICHLOROETHENE	LLM,LLW	447	30	510	SA	A
D035	MEK	LLM,LLW	447	30	510	SA	A
D040	TRICHLOROETHYLENE	LLM,LLW	447	30	510	SA	A
D043	VINYL CHLORIDE	LLM,LLW	447	30	510	SA	A
ENDRIN		LLM,LLW	447	30	510	SA	A
ENDRIN		LLM,LAB	447	6	501	SA	A
ENDRIN		LLM,LLW	447	30	510	SA	A
ENDRIN		LLM,HAZ,LLW	447	39.02	NA	TA	A
ENDRIN		LLM,HAZ,LLW	447	39.02	NA	TA	A
D008	LEAD	LLM,HAZ,LLW	447	39.02	NA	TA	A
D019	CARBON TET	LLM,HAZ,LLW	447	39.02	NA	TA	A
D028	1,4-DICHLOROETHANE	LLM,HAZ,LLW	447	39.02	NA	TA	A
ENDRIN		LLM,LAB	447	6	501	SA	A
D029	1,1-DICHLOROETHENE	LLM,HAZ,LLW	447	39.02	NA	TA	A
D035	MEK	LLM,HAZ,LLW	447	39.02	NA	TA	A
D038	PYRIDINE	LLM,HAZ,LLW	447	39.02	NA	TA	A
D018	BENZENE	LLM,LAB	447	6	501	SA	A
D018	BENZENE	LLM,LLW	447	30	510	SA	A
ENDRIN		LLM,HAZ,LLW	447	39.02	NA	TA	A
ENDRIN		LLM	447	30	501	TA	A
D005		LLM,HAZ,LLW	447	39.02	NA	TA	A
D018	BENZENE	LLM,HAZ,LLW	447	39.02	NA	TA	A
		LAB,LLM	447	39.02	31	TA	A
D040	TRICHLOROETHYLENE	LLM,HAZ,LLW	447	39.02	NA	TA	A
D043	VINYL CHLORIDE	LLM,HAZ,LLW	447	39.02	NA	TA	A
ENDRIN		LLM,HAZ,LLW	447	39.02	NA	TA	A
D007		LLM,HAZ,LLW	447	39.02	NA	TA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D043	VINYL CHLORIDE	LLM,LAB	447	6	501	SA	A
ENDRIN		LLM,HAZ,LLW	447	39.02	NA	TA	A
ENDRIN		LLM	447	30	501	TA	A
D001		LLM,LAB	447	6	501	SA	A
D001		LLM,HAZ,LLW	447	39.02	NA	TA	A
D001		LLM,LLW	447	30	510	SA	A
D019	CARBON TET	LLM,LAB	447	6	501	SA	A
D028	1,4-DICHLOROETHANE	LLM,LAB	447	6	501	SA	A
D029	1,1-DICHLOROETHENE	LLM,LAB	447	6	501	SA	A
D035	MEK	LLM,LAB	447	6	501	SA	A
D038	PYRIDINE	LLM,LAB	447	6	501	SA	A
D040	TRICHLOROETHYLENE	LLM,LAB	447	6	501	SA	A
		LAB,HAZ,LLW	460	39.03	140	TA	A
D004		LLM,HAZ,LLW	551	18.01	NA	ST	A
D006		LLM,HAZ,LLW	551	18.05	NA	ST	A
D005		LLM,HAZ,LLW	551	18.05	NA	ST	A
D004		LLM,HAZ,LLW	551	18.05	NA	ST	A
D008	LEAD	LLM,HAZ,LLW	551	18.06	NA	ST	A
D022	CHLOROFORM	LLM,HAZ,LLW	551	18.05	NA	ST	A
D008	LEAD	LLM,HAZ,LLW	551	18.01	NA	ST	A
D007		LLM,HAZ,LLW	551	18.01	NA	ST	A
D007		LLM,HAZ,LLW	551	18.05	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.05	NA	ST	A
D008	LEAD	LLM,HAZ,LLW	551	18.05	NA	ST	A
D005		LLM,HAZ,LLW	551	18.01	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.06	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.05	NA	ST	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D019	CARBON TET	LLM,HAZ,LLW	551	18.05	NA	ST	A
D011	SILVER	LLM,HAZ,LLW	551	18.05	NA	ST	A
D009	MERCURY	LLM,HAZ,LLW	551	18.05	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.01	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.01	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.01	NA	ST	A
D009	MERCURY	LLM,HAZ,LLW	551	18.06	NA	ST	A
D019	CARBON TET	LLM,HAZ,LLW	551	18.01	NA	ST	A
D011	SILVER	LLM,HAZ,LLW	551	18.01	NA	ST	A
D009	MERCURY	LLM,HAZ,LLW	551	18.01	NA	ST	A
D019	CARBON TET	LLM,HAZ,LLW	551	18.02	NA	TA	A
D004		LLM,HAZ,LLW	551	18.02	NA	TA	A
ENDRIN		LLM,HAZ,LLW	551	18.06	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.02	NA	TA	A
D022	CHLOROFORM	LLM,HAZ,LLW	551	18.01	NA	ST	A
D005		LLM,HAZ,LLW	551	18.02	NA	TA	A
D006		LLM,HAZ,LLW	551	18.02	NA	TA	A
D007		LLM,HAZ,LLW	551	18.02	NA	TA	A
D008	LEAD	LLM,HAZ,LLW	551	18.02	NA	TA	A
D009	MERCURY	LLM,HAZ,LLW	551	18.02	NA	TA	A
D011	SILVER	LLM,HAZ,LLW	551	18.02	NA	TA	A
ENDRIN		LLM,HAZ,LLW	551	18.02	NA	TA	A
D022	CHLOROFORM	LLM,HAZ,LLW	551	18.02	NA	TA	A
ENDRIN		LLM,HAZ,LLW	551	18.02	NA	TA	A
ENDRIN		LLM,HAZ,LLW	551	18.02	NA	TA	A
ENDRIN		LLM,HAZ,LLW	551	18.05	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.06	NA	ST	A

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME: SHIFT SUPERINTENDENT

PHONE: (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS:

[ ] Pure [X] Mix

Chemical Name: ZYGLO DEVELOPER

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[ ] Immediate (acute)
[X] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)

04 Average Daily Amount (code)

365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
C	4	1	444/143H, 460/151
F	4	2	705, 889/104, 707
J	4	1	460/151
F	4	1	440, 991/165,707/171,883/112

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: [ ] Pure [X] Mix

Chemical Name: HARSHAW CATALYST

EHS Name:

[X] Solid
[ ] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type D | Temperature 4 | Pressure 1 | Storage Locations 061

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS [ ] Pure [X] Mix
Chemical Name: TRANSFORMER OIL
EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[X] Immediate (acute)
[ ] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	444/139, 460/151
D	4	1	125/109, 61, 885
E	4	1	707/120
F	4	1	707/120, 770
N	4	1	779/113
C	4	1	444, 460

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000, P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME: SHIFT SUPERINTENDENT

PHONE: (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS:

[ ] Pure [X] Mix

Chemical Name: UNLEADED FUEL

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[ ] Immediate (acute)
[ ] Delayed (chronic)

Inventory

05	Maximum Daily Amount (code)
05	Average Daily Amount (code)
365	Number of Days On-site (days)

Container Type: B | Temperature: 4 | Pressure: 1 | Storage Locations: 331

Tier Two
Emergency and Hazardous Chemical Inventory
Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS:
[ ] Pure [X] Mix
Chemical Name: TENECO CATALYST
EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[X] Sudden Release of Pressure
[ ] Reactivity
[ ] Immediate (acute)
[ ] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type: F Temperature: 4 Pressure: 1 Storage Locations: 707, 776/134, 778/110, 991/WEST, 559/129, 885, 980, 449, 551, 968, 779, 371/3160, 771/131

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 127-18-4 [X] Pure [ ] Mix

Chemical Name: TETRACHLOROETHYLENE

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

04	Maximum Daily Amount (code)
04	Average Daily Amount (code)
365	Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	883
F	4	1	779/113
M	4	1	559/103

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 ***24 HOURS***

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 7446-09-5 [X] Pure [ ] Mix

Chemical Name: SULFUR DIOXIDE

EHS Name: SULFUR DIOXIDE

[ ] Solid
[ ] Liquid
[X] Gas
[X] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

03 Maximum Daily Amount (code)

03 Average Daily Amount (code)

365 Number of Days On-site (days)

Container Type L Temperature 4 Pressure 2 Storage Locations 552, 559/107, 449, 995, 123/111, 444, 779

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 7664-93-9 [X] Pure [X] Mix

Chemical Name: SULFURIC ACID

EHS Name: SULFURIC ACID

[X] Solid
[X] Liquid
[ ] Gas
[X] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	443
E	4	1	703, T900D, GAC-TRLR, 771/249, 373, 371/3159
G	4	1	559/129
J	4	1	374, 881/255,774
M	4	1	371, 779, 783, 444, 881, 559, 771, 776/159A2, T891O, T891N, 774/220, 123/103, 777/415, 991/110, T891R, T771F, T891D, 460,701,891, 995
N	4	1	783, 701/101, 371/3412, 779, 881/264, 460/226, 777/415, 910, 371/2117
R	4	1	995

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address: U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address: EG&G Rocky Flats, Inc. Phone 303-966-7000, P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 1310-73-2 [X] Pure [ ] Mix

Chemical Name: SODIUM HYDROXIDE

EHS Name:

[X] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[ ] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	889, 443, 460, 891
D	4	1	124
E	4	1	865/145, 443, T900D
F	4	1	444/204
J	4	1	440
K	4	1	701/101, 776/154A
M	4	1	779, 444/201, 881, T891L
N	4	1	881, 776, 371, 559/102, 123/125, 865/106, 991/110, T891O, 779/234B, 444/201, 705/100, T891R, 701/101, T771F, T891D, 777/415, 910
R	4	1	559/102

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

FOR OFFICIAL USE ONLY — ID # — DATE RECEIVED

Owner/Operator	U.S. Department of Energy
Mail Address	P.O. Box 928, Golden, CO 80402-0928
Co-Operator	EG&G Rocky Flats, Inc. Phone 303-966-7000
Mail Address	P.O. Box 464, Golden, CO 80402-0464

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 7631-99-4 [X] Pure [ ] Mix

Chemical Name SODIUM NITRATE

EHS Name

[X] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[ ] Immediate (acute)
[X] Delayed (chronic)

Inventory

05 Maximum Daily Amount (code)
05 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	460
C	4	1	460
D	4	1	701/107
F	4	1	701/101
I	4	1	551, 707/107
J	4	1	701, 460, 881
K	4	1	701/101, 881
M	4	1	779, 881, 559/129, 701/101,123,776
N	4	1	881, 701/101, 779/139, 559/129, 123/111, 371, 776/159A2
C	4	1	374/4101

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: [ ] Pure [X] Mix

Chemical Name: PURIFLOC

EHS Name:

[X] Solid [X] Liquid [ ] Gas [ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[X] Immediate (acute)
[ ] Delayed (chronic)

Inventory

04	Maximum Daily Amount (code)
04	Average Daily Amount (code)
365	Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	374
J	4	1	374/CHEM-PREP, 774
N	4	1	779/137, 371/3112

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS

[ ] Pure [X] Mix

Chemical Name: REGAL OIL R&O 68 #007002

EHS Name:

[ ] Solid [X] Liquid [ ] Gas [ ] EHS

Physical And Health Hazards

[X] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[X] Immediate (acute)
[ ] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)

04 Average Daily Amount (code)

365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
D	4	1	881, 883, 443, 551, 460/140A, 885, 708, T707S, 707/210, 770, 776, 980
F	4	1	778/105
N	4	1	707/186

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 1310-58-3 [X] Pure [ ] Mix

Chemical Name: POTASSIUM HYDROXIDE

EHS Name:

[X] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[ ] Delayed (chronic)

Inventory

06 Maximum Daily Amount (code)

06 Average Daily Amount (code)

365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	883, 374, 771/146, 714
D	4	1	374/CHEM-PREP
E	4	1	444/201
J	4	1	779/137
K	4	1	995
M	4	1	701/101, 559, 776/159A2, 777/415, 779/137,881
N	4	1	779, 881, 371, T903A, 444, 707/135, 991, T891L, 559/102, 865/106, 910/104
R	4	1	559/102
C	4	1	374/4101, 714

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 74-98-6 [X] Pure [ ] Mix

Chemical Name: PROPANE

EHS Name:

[ ] Solid
[X] Liquid
[X] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[X] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[ ] Delayed (chronic)

Inventory

05 Maximum Daily Amount (code)
05 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	2	788, 549, 866, 904 PAD, 439, 442, 713, 771, 774, 792,335,T439A,T442A,331,T760A,T732A,T762A,T372A,750
L	4	2	559/103, 552, 515, 965, 883/144, 777/431A, 980, 707/127, 440,881/224,331,779/222
F	4	2	779/157,559/103

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 68476-85-7 [ ] Pure [X] Mix

Chemical Name: PETROLEUM GAS (LIQUIFIED)

EHS Name:

[ ] Solid
[X] Liquid
[X] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[X] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[ ] Delayed (chronic)

Inventory

05 Maximum Daily Amount (code)

05 Average Daily Amount (code)

365 Number of Days On-site (days)

Container Type L Temperature 4 Pressure 2 Storage Locations 440

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator	U.S. Department of Energy
Mail Address	P.O. Box 928, Golden, CO 80402-0928
Co-Operator	EG&G Rocky Flats, Inc. Phone 303-966-7000
Mail Address	P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 1314-56-3 [X] Pure [ ] Mix

Chemical Name: PHOSPHORUS PENTOXIDE

EHS Name: PHOSPHORUS PENTOXIDE

[X] Solid
[X] Liquid
[ ] Gas
[X] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

01 Maximum Daily Amount (code)

01 Average Daily Amount (code)

365 Number of Days On-site (days)

Container Type: M | Temperature: 4 | Pressure: 1 | Storage Locations: 779, 881/267, 444, 123/111

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

FOR OFFICIAL USE ONLY: ID # | DATE RECEIVED

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: [ ] Pure: [ ] Mix: [X]

Chemical Name: OIL, COOLANT

EHS Name:

Solid: [ ] Liquid: [X] Gas: [ ] EHS: [ ]

Physical And Health Hazards

Fire: [X]
Sudden Release of Pressure: [ ]
Reactivity: [ ]
Immediate (acute): [ ]
Delayed (chronic): [ ]

Inventory

Maximum Daily Amount (code): 04
Average Daily Amount (code): 04
Number of Days On-site (days): 365

Container Type	Temperature	Pressure	Storage Locations
A	4	1	460/135
N	4	1	551, T777B, 991/164

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address: U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address: EG&G Rocky Flats, Inc. Phone 303-966-7000, P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS [ ] [ ] Pure [X] Mix

Chemical Name: OIL, VACUUM PUMP

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[ ] Immediate (acute)
[ ] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	460/132,440
D	4	1	776/207, T707S
M	4	1	559/103,779/141C
N	4	1	559/103, 708, 779, 707/125, 444/15, 777/452, 991/110, 776/158
R	4	1	559/103
C	4	1	460

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 | 605 | 1538

Owner/Operator	U.S. Department of Energy
Mail Address	P.O. Box 928, Golden, CO 80402-0928
Co-Operator	EG&G Rocky Flats, Inc. Phone 303-966-7000
Mail Address	P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: 7727-37-9 [X] Pure [ ] Mix

Chemical Name: NITROGEN

EHS Name:

[ ] Solid
[X] Liquid
[X] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[X] Sudden Release of Pressure
[ ] Reactivity
[X] Immediate (acute)
[ ] Delayed (chronic)

Inventory

Maximum Daily Amount (code)	06
Average Daily Amount (code)	06
Number of Days On-site (days)	365

Container Type	Temperature	Pressure	Storage Locations
P	4	2	707/130
A	4	2	559, 371, 881, 444, 374, 771, 706, 123, 122, 705, 460, 205
L	4	2	778, 779, 552, 559, 663, 371, 373, 123, 125, 374, 460, 707, 708, 718, 771/158, 777, 776, 881, 991/111, 980, 776/2NDFLR, T452G/EQUIP, 440/112, 444/101k, 991/137, 440,112, 777/1, 447, 122
R	4	2	T690J

Tier Two Emergency and Hazardous Chemical Inventory *Specific Information By Chemical*	U.S. Department of Energy Rocky Flats Plant EG&G Rocky Flats, Inc. Section 2, Range70W, Township 2S Golden, Jefferson County, CO 80402 SIC Code 3489 Dun & Brnd Number 61 605 1538	Owner/Operator: U.S. Department of Energy Mail Address: P.O. Box 928, Golden, CO 80402-0928 Co-Operator: EG&G Rocky Flats, Inc. Phone 303-966-7000 Mail Address: P.O. Box 464, Golden, CO 80402-0464
	FOR OFFICIAL USE ONLY ID # DATE RECEIVED	**EMERGENCY CONTACT** NAME SHIFT SUPERINTENDENT PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description		Physical And Health Hazards	Inventory
CAS [ ] Pure [ ] Mix [X] Chemical Name: OIL EHS Name:	Solid [ ] Liquid [X] Gas [ ] EHS [ ]	Fire [X] Sudden Release of Pressure [ ] Reactivity [ ] Immediate (acute) [ ] Delayed (chronic) [ ]	04 Maximum Daily Amount (code) 04 Average Daily Amount (code) 365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	444, 460/CRUSH, 881, 707/200
C	4	1	460/230, 707/200
F	4	1	707,777,374
N	4	1	779,707,705,771

Appendix 3.9
Industrial Area IM/IRA/DD
Other Materials of Concern - Radionuclides

RADIONUCLIDE	BUILDING LOCATION													
Americium	371	374	559	707	771	774	776	777							
Plutonium	371	374	559	707	771	774	776	777	779	886					
Thorium	334	771	881												
Tritium	374	559	561	707	771	774	777	779							
Uranium	331	334	371	374	444	447	559	707	771	776	777	881	883	865	886

APPENDIX 3.9

INDUSTRIAL AREA IM/IRA/DD

OTHER MATERIALS OF CONCERN - RADIONUCLIDES

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D011	SILVER	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D018	BENZENE	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D028	1,4-DICHLOROETHANE	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D035	MEK	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D040	TRICHLOROETHYLENE	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D043	VINYL CHLORIDE	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.28	E-AND-F-HALL	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.28	E-AND-F-HALL	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A

The following abbreviations are used in this table:

A	Active	RES	Residue
LAB	Awaiting waste type determination	SA	Storage Area
LLM	Low Level Mixed wastes	ST	Storage Tank
LLT	Low Level TSCA (Toxic Substances Control Act) regulated waste	TA	Treatment Area
LLW	Low Level Wastes	TRM	Transuranic Mixed Hazardous Wastes
MEK	2-butanone	TRU	Transuranic Wastes
NON	Non-radioactive, non-hazardous wastes	TSC	Straight TSCA regulated waste
REM	Residue, mixed		

(intentionally blank)

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D010	SELENIUM		707	90.105	130B	SA	A
D011	SILVER		707	90.105	130B	SA	A
D018	BENZENE		707	90.105	130B	SA	A
D019	CARBON TET		707	90.105	130B	SA	A
D022	CHLOROFORM		707	90.105	130B	SA	A
D028	1,4–DICHLOROETHANE		707	90.105	130B	SA	A
D029	1,1–DICHLOROETHENE		707	90.105	130B	SA	A
D035	MEK		707	90.105	130B	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C–AND–D–HALL	SA	A
D011	SILVER		707	90.146	MOD_C_GB_C–40	SA	A
D018	BENZENE		707	90.146	MOD_C_GB_C–40	SA	A
D019	CARBON TET		707	90.146	MOD_C_GB_C–40	SA	A
D022	CHLOROFORM		707	90.146	MOD_C_GB_C–40	SA	A
D028	1,4–DICHLOROETHANE		707	90.146	MOD_C_GB_C–40	SA	A
D035	MEK		707	90.146	MOD_C_GB_C–40	SA	A
D040	TRICHLOROETHYLENE		707	90.146	MOD_C_GB_C–40	SA	A
D043	VINYL CHLORIDE		707	90.146	MOD_C_GB_C–40	SA	A
ENDRIN			707	90.146	MOD_C_GB_C–40	SA	A
ENDRIN			707	90.146	MOD_C_GB_C–40	SA	A
ENDRIN			707	90.146	MOD_C_GB_C–40	SA	A
ENDRIN			707	90.146	MOD_C_GB_C–40	SA	A
ENDRIN			707	90.146	MOD_C_GB_C–40	SA	A
ENDRIN			707	90.146	MOD_C_GB_C–40	SA	A
D001		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K–45	SA	A
D002		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K–45	SA	A
D003		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K–45	SA	A
D005		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K–45	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D006		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D007		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D008	LEAD	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D009	MERCURY	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D010	SELENIUM	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D011	SILVER	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D018	BENZENE	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D019	CARBON TET	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D028	1,4-DICHLOROETHANE	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D035	MEK	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D040	TRICHLOROETHYLENE	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D043	VINYL CHLORIDE	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
ENDRIN		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
ENDRIN		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
ENDRIN		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
ENDRIN		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
ENDRIN		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
ENDRIN		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D007		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D019	CARBON TET	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D028	1,4-DICHLOROETHANE	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D035	MEK	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D040	TRICHLOROETHYLENE	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D043	VINYL CHLORIDE	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D001		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D002		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D003		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D005		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D006		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D007		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D008	LEAD	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D009	MERCURY	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D010	SELENIUM	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D011	SILVER	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D018	BENZENE	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D019	CARBON TET	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D028	1,4-DICHLOROETHANE	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D035	MEK	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D040	TRICHLOROETHYLENE	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D043	VINYL CHLORIDE	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D001			707	90.146	MOD_C_GB_C-40	SA	A
D002			707	90.146	MOD_C_GB_C-40	SA	A
D003			707	90.146	MOD_C_GB_C-40	SA	A
D005			707	90.146	MOD_C_GB_C-40	SA	A
D006			707	90.146	MOD_C_GB_C-40	SA	A
D007			707	90.146	MOD_C_GB_C-40	SA	A
D008	LEAD		707	90.146	MOD_C_GB_C-40	SA	A
D009	MERCURY		707	90.146	MOD_C_GB_C-40	SA	A
D010	SELENIUM		707	90.146	MOD_C_GB_C-40	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.28	E-AND-F-HALL	SA	A
D001			707	90.105	130B	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.28	E-AND-F-HALL	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.28	E-AND-F-HALL	SA	A
D002			707	90.105	130B	SA	A
D003			707	90.105	130B	SA	A
D004			707	90.105	130B	SA	A
D005			707	90.105	130B	SA	A
D006			707	90.105	130B	SA	A
D007			707	90.105	130B	SA	A
D008	LEAD		707	90.105	130B	SA	A
D009	MERCURY		707	90.105	130B	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D043	VINYL CHLORIDE	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D035	MEK	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D022	CHLOROFORM	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D019	CARBON TET	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D018	BENZENE	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D011	SILVER	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D010	SELENIUM	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D009	MERCURY	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D008	LEAD	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D007		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D006		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D005		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D004		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D003		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D035	MEK	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D018	BENZENE	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D029	1,1-DICHLOROETHENE	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D028	1,4-DICHLOROETHANE	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D038	PYRIDINE		707	90.105	130B	SA	A
D040	TRICHLOROETHYLENE		707	90.105	130B	SA	A
D043	VINYL CHLORIDE		707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
D001		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D002		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D003		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D005		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D006		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D007		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D008	LEAD	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D009	MERCURY	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D010	SELENIUM	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D011	SILVER	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D018	BENZENE	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D001		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D002		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D010	SELENIUM	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D011	SILVER	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D019	CARBON TET	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D028	1,4-DICHLOROETHANE	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D029	1,1-DICHLOROETHENE	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D035	MEK	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D038	PYRIDINE	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D006		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D004		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D008	LEAD	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D009	MERCURY	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D007		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D040	TRICHLOROETHYLENE	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D003		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D011	SILVER	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D019	CARBON TET	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D022	CHLOROFORM	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D010	SELENIUM	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D001		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D004		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D009	MERCURY	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D008	LEAD	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D007		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D006		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D005		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D003		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D002		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D001		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D043	VINYL CHLORIDE	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D040	TRICHLOROETHYLENE	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D038	PYRIDINE	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D038	PYRIDINE	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D002		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLM,LLW,NON	561	10	CC7	SA	A
ENDRIN		LLM,LLW,NON	561	10	CC7	SA	A
ENDRIN		LLM,LLW,NON	561	10	CC7	SA	A
ENDRIN		LLM,LLW,NON	561	10	CC7	SA	A
ENDRIN		LLM,LLW,NON	561	10	CC7	SA	A
ENDRIN		LLM,LLW,NON	561	10	CC7	SA	A
ENDRIN		LLM,LLW,NON	561	10	CC7	SA	A
ENDRIN		LLM,LLW,NON	561	10	CC7	SA	A
D001		LLW,LLM,NON	561	10	CC8	SA	A
D002		LLW,LLM,NON	561	10	CC8	SA	A
D003		LLW,LLM,NON	561	10	CC8	SA	A
D004		LLW,LLM,NON	561	10	CC8	SA	A
D005		LLW,LLM,NON	561	10	CC8	SA	A
D006		LLW,LLM,NON	561	10	CC8	SA	A
D007		LLW,LLM,NON	561	10	CC8	SA	A
D008	LEAD	LLW,LLM,NON	561	10	CC8	SA	A
D009	MERCURY	LLW,LLM,NON	561	10	CC8	SA	A
D010	SELENIUM	LLW,LLM,NON	561	10	CC8	SA	A
D011	SILVER	LLW,LLM,NON	561	10	CC8	SA	A
D018	BENZENE	LLW,LLM,NON	561	10	CC8	SA	A
D019	CARBON TET	LLW,LLM,NON	561	10	CC8	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM,NON	561	10	CC8	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM,NON	561	10	CC8	SA	A
D035	MEK	LLW,LLM,NON	561	10	CC8	SA	A
D038	PYRIDINE	LLW,LLM,NON	561	10	CC8	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM,NON	561	10	CC8	SA	A
D043	VINYL CHLORIDE	LLW,LLM,NON	561	10	CC8	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLW,LLM,NON	561	10	CC8	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC8	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC8	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC8	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC8	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC8	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC8	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC8	SA	A
D001		LLW,LLM,NON	561	10	CC9	SA	A
D002		LLW,LLM,NON	561	10	CC9	SA	A
D003		LLW,LLM,NON	561	10	CC9	SA	A
D004		LLW,LLM,NON	561	10	CC9	SA	A
D005		LLW,LLM,NON	561	10	CC9	SA	A
D006		LLW,LLM,NON	561	10	CC9	SA	A
D007		LLW,LLM,NON	561	10	CC9	SA	A
D008	LEAD	LLW,LLM,NON	561	10	CC9	SA	A
D009	MERCURY	LLW,LLM,NON	561	10	CC9	SA	A
D010	SELENIUM	LLW,LLM,NON	561	10	CC9	SA	A
D011	SILVER	LLW,LLM,NON	561	10	CC9	SA	A
D018	BENZENE	LLW,LLM,NON	561	10	CC9	SA	A
D019	CARBON TET	LLW,LLM,NON	561	10	CC9	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM,NON	561	10	CC9	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM,NON	561	10	CC9	SA	A
D035	MEK	LLW,LLM,NON	561	10	CC9	SA	A
D005		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	
D018	BENZENE	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D043	VINYL CHLORIDE	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A

RCRA–REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLW,LLM,NON	561	10	CC5	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC5	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC5	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC5	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC5	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC5	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC5	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC5	SA	A
D001		LLW,LLM,NON	561	10	CC6	SA	A
D002		LLW,LLM,NON	561	10	CC6	SA	A
D003		LLW,LLM,NON	561	10	CC6	SA	A
D004		LLW,LLM,NON	561	10	CC6	SA	A
D005		LLW,LLM,NON	561	10	CC6	SA	A
D006		LLW,LLM,NON	561	10	CC6	SA	A
D007		LLW,LLM,NON	561	10	CC6	SA	A
D008	LEAD	LLW,LLM,NON	561	10	CC6	SA	A
D009	MERCURY	LLW,LLM,NON	561	10	CC6	SA	A
D010	SELENIUM	LLW,LLM,NON	561	10	CC6	SA	A
D011	SILVER	LLW,LLM,NON	561	10	CC6	SA	A
D018	BENZENE	LLW,LLM,NON	561	10	CC6	SA	A
D019	CARBON TET	LLW,LLM,NON	561	10	CC6	SA	A
D028	1,4–DICHLOROETHANE	LLW,LLM,NON	561	10	CC6	SA	A
D029	1,1–DICHLOROETHENE	LLW,LLM,NON	561	10	CC6	SA	A
D035	MEK	LLW,LLM,NON	561	10	CC6	SA	A
D038	PYRIDINE	LLW,LLM,NON	561	10	CC6	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM,NON	561	10	CC6	SA	A
D043	VINYL CHLORIDE	LLW,LLM,NON	561	10	CC6	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLW,LLM,NON	561	10	CC6	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC6	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC6	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC6	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC6	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC6	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC6	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC6	SA	A
D001		LLM,LLW,NON	561	10	CC7	SA	A
D002		LLM,LLW,NON	561	10	CC7	SA	A
D003		LLM,LLW,NON	561	10	CC7	SA	A
D004		LLM,LLW,NON	561	10	CC7	SA	A
D005		LLM,LLW,NON	561	10	CC7	SA	A
D006		LLM,LLW,NON	561	10	CC7	SA	A
D007		LLM,LLW,NON	561	10	CC7	SA	A
D008	LEAD	LLM,LLW,NON	561	10	CC7	SA	A
D009	MERCURY	LLM,LLW,NON	561	10	CC7	SA	A
D010	SELENIUM	LLM,LLW,NON	561	10	CC7	SA	A
D011	SILVER	LLM,LLW,NON	561	10	CC7	SA	A
D018	BENZENE	LLM,LLW,NON	561	10	CC7	SA	A
D019	CARBON TET	LLM,LLW,NON	561	10	CC7	SA	A
D028	1,4-DICHLOROETHANE	LLM,LLW,NON	561	10	CC7	SA	A
D029	1,1-DICHLOROETHENE	LLM,LLW,NON	561	10	CC7	SA	A
D035	MEK	LLM,LLW,NON	561	10	CC7	SA	A
D038	PYRIDINE	LLM,LLW,NON	561	10	CC7	SA	A
D040	TRICHLOROETHYLENE	LLM,LLW,NON	561	10	CC7	SA	A
D043	VINYL CHLORIDE	LLM,LLW,NON	561	10	CC7	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D019	CARBON TET	LLW,LLM	561	10	CC1	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM	561	10	CC1	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM	561	10	CC1	SA	A
D038	PYRIDINE	LLW,LLM	561	10	CC1	SA	A
D035	MEK	LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC3	SA	A
ENDRIN		LLW,LLM	561	10	CC3	SA	A
ENDRIN		LLW,LLM	561	10	CC3	SA	A
D001		LLW,LLM	561	10	CC4	SA	A
D002		LLW,LLM	561	10	CC4	SA	A
D003		LLW,LLM	561	10	CC4	SA	A
D004		LLW,LLM	561	10	CC4	SA	A
D005		LLW,LLM	561	10	CC4	SA	A
D006		LLW,LLM	561	10	CC4	SA	A
D007		LLW,LLM	561	10	CC4	SA	A
D008	LEAD	LLW,LLM	561	10	CC4	SA	A
D009	MERCURY	LLW,LLM	561	10	CC4	SA	A
D010	SELENIUM	LLW,LLM	561	10	CC4	SA	A
D011	SILVER	LLW,LLM	561	10	CC4	SA	A
D018	BENZENE	LLW,LLM	561	10	CC4	SA	A
D019	CARBON TET	LLW,LLM	561	10	CC4	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM	561	10	CC4	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM	561	10	CC4	SA	A
D035	MEK	LLW,LLM	561	10	CC4	SA	A
D038	PYRIDINE	LLW,LLM	561	10	CC4	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM	561	10	CC4	SA	A
D043	VINYL CHLORIDE	LLW,LLM	561	10	CC4	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLW,LLM	561	10	CC4	SA	A
ENDRIN		LLW,LLM	561	10	CC4	SA	A
ENDRIN		LLW,LLM	561	10	CC4	SA	A
ENDRIN		LLW,LLM	561	10	CC4	SA	A
ENDRIN		LLW,LLM	561	10	CC4	SA	A
ENDRIN		LLW,LLM	561	10	CC4	SA	A
ENDRIN		LLW,LLM	561	10	CC4	SA	A
ENDRIN		LLW,LLM	561	10	CC4	SA	A
D001		LLW,LLM,NON	561	10	CC5	SA	A
D002		LLW,LLM,NON	561	10	CC5	SA	A
D003		LLW,LLM,NON	561	10	CC5	SA	A
D004		LLW,LLM,NON	561	10	CC5	SA	A
D005		LLW,LLM,NON	561	10	CC5	SA	A
D006		LLW,LLM,NON	561	10	CC5	SA	A
D007		LLW,LLM,NON	561	10	CC5	SA	A
D008	LEAD	LLW,LLM,NON	561	10	CC5	SA	A
D009	MERCURY	LLW,LLM,NON	561	10	CC5	SA	A
D010	SELENIUM	LLW,LLM,NON	561	10	CC5	SA	A
D011	SILVER	LLW,LLM,NON	561	10	CC5	SA	A
D018	BENZENE	LLW,LLM,NON	561	10	CC5	SA	A
D019	CARBON TET	LLW,LLM,NON	561	10	CC5	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM,NON	561	10	CC5	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM,NON	561	10	CC5	SA	A
D035	MEK	LLW,LLM,NON	561	10	CC5	SA	A
D038	PYRIDINE	LLW,LLM,NON	561	10	CC5	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM,NON	561	10	CC5	SA	A
D043	VINYL CHLORIDE	LLW,LLM,NON	561	10	CC5	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLW,LLM	561	10	CC2	SA	A
ENDRIN		LLW,LLM	561	10	CC2	SA	A
ENDRIN		LLW,LLM	561	10	CC2	SA	A
ENDRIN		LLW,LLM	561	10	CC2	SA	A
ENDRIN		LLW,LLM	561	10	CC2	SA	A
D001		LLW,LLM	561	10	CC3	SA	A
D002		LLW,LLM	561	10	CC3	SA	A
D003		LLW,LLM	561	10	CC3	SA	A
D004		LLW,LLM	561	10	CC3	SA	A
D005		LLW,LLM	561	10	CC3	SA	A
D006		LLW,LLM	561	10	CC3	SA	A
D007		LLW,LLM	561	10	CC3	SA	A
D008	LEAD	LLW,LLM	561	10	CC3	SA	A
D009	MERCURY	LLW,LLM	561	10	CC3	SA	A
D010	SELENIUM	LLW,LLM	561	10	CC3	SA	A
D011	SILVER	LLW,LLM	561	10	CC3	SA	A
D018	BENZENE	LLW,LLM	561	10	CC3	SA	A
D019	CARBON TET	LLW,LLM	561	10	CC3	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM	561	10	CC3	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM	561	10	CC3	SA	A
D035	MEK	LLW,LLM	561	10	CC3	SA	A
D038	PYRIDINE	LLW,LLM	561	10	CC3	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM	561	10	CC3	SA	A
D043	VINYL CHLORIDE	LLW,LLM	561	10	CC3	SA	A
ENDRIN		LLW,LLM	561	10	CC3	SA	A
ENDRIN		LLW,LLM	561	10	CC3	SA	A
ENDRIN		LLW,LLM	561	10	CC3	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLW,LLM	561	10	CC3	SA	A
D029	1,1-DICHLOROETHENE	LLM,NON	561	10	OUTSIDE	SA	A
D035	MEK	LLM,NON	561	10	OUTSIDE	SA	A
D038	PYRIDINE	LLM,NON	561	10	OUTSIDE	SA	A
D040	TRICHLOROETHYLENE	LLM,NON	561	10	OUTSIDE	SA	A
D043	VINYL CHLORIDE	LLM,NON	561	10	OUTSIDE	SA	A
ENDRIN		LLW,LLM	561	10	CC3	SA	A
ENDRIN		LLM,NON	561	10	OUTSIDE	SA	A
ENDRIN		LLM,NON	561	10	OUTSIDE	SA	A
ENDRIN		LLM,NON	561	10	OUTSIDE	SA	A
ENDRIN		LLM,NON	561	10	OUTSIDE	SA	A
ENDRIN		LLM,NON	561	10	OUTSIDE	SA	A
ENDRIN		LLM,NON	561	10	OUTSIDE	SA	A
ENDRIN		LLM,NON	561	10	OUTSIDE	SA	A
ENDRIN		LLM,NON	561	10	OUTSIDE	SA	A
D001		LLW,LLM	561	10	CC1	SA	A
D002		LLW,LLM	561	10	CC1	SA	A
D003		LLW,LLM	561	10	CC1	SA	A
D004		LLW,LLM	561	10	CC1	SA	A
D005		LLW,LLM	561	10	CC1	SA	A
D006		LLW,LLM	561	10	CC1	SA	A
D007		LLW,LLM	561	10	CC1	SA	A
D008	LEAD	LLW,LLM	561	10	CC1	SA	A
D009	MERCURY	LLW,LLM	561	10	CC1	SA	A
D010	SELENIUM	LLW,LLM	561	10	CC1	SA	A
D011	SILVER	LLW,LLM	561	10	CC1	SA	A
D018	BENZENE	LLW,LLM	561	10	CC1	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLW,LLM,NON	561	10	CC9	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC9	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC9	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC9	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC9	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC9	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC9	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC9	SA	A
D001		LLM,NON	561	10	OUTSIDE	SA	A
D002		LLM,NON	561	10	OUTSIDE	SA	A
D003		LLM,NON	561	10	OUTSIDE	SA	A
D004		LLM,NON	561	10	OUTSIDE	SA	A
D005		LLM,NON	561	10	OUTSIDE	SA	A
D006		LLM,NON	561	10	OUTSIDE	SA	A
D007		LLM,NON	561	10	OUTSIDE	SA	A
D008	LEAD	LLM,NON	561	10	OUTSIDE	SA	A
D009	MERCURY	LLM,NON	561	10	OUTSIDE	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM	561	10	CC1	SA	A
D043	VINYL CHLORIDE	LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC1	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D001		LLW,LLM	561	10	CC2	SA	A
D002		LLW,LLM	561	10	CC2	SA	A
D003		LLW,LLM	561	10	CC2	SA	A
D004		LLW,LLM	561	10	CC2	SA	A
D005		LLW,LLM	561	10	CC2	SA	A
D006		LLW,LLM	561	10	CC2	SA	A
D007		LLW,LLM	561	10	CC2	SA	A
D010	SELENIUM	LLM,NON	561	10	OUTSIDE	SA	A
D011	SILVER	LLM,NON	561	10	OUTSIDE	SA	A
D018	BENZENE	LLM,NON	561	10	OUTSIDE	SA	A
D019	CARBON TET	LLM,NON	561	10	OUTSIDE	SA	A
D028	1,4-DICHLOROETHANE	LLM,NON	561	10	OUTSIDE	SA	A
D008	LEAD	LLW,LLM	561	10	CC2	SA	A
D009	MERCURY	LLW,LLM	561	10	CC2	SA	A
D010	SELENIUM	LLW,LLM	561	10	CC2	SA	A
D011	SILVER	LLW,LLM	561	10	CC2	SA	A
D018	BENZENE	LLW,LLM	561	10	CC2	SA	A
D019	CARBON TET	LLW,LLM	561	10	CC2	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM	561	10	CC2	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM	561	10	CC2	SA	A
D035	MEK	LLW,LLM	561	10	CC2	SA	A
D038	PYRIDINE	LLW,LLM	561	10	CC2	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM	561	10	CC2	SA	A
D043	VINYL CHLORIDE	LLW,LLM	561	10	CC2	SA	A
ENDRIN		LLW,LLM	561	10	CC2	SA	A
ENDRIN		LLW,LLM	561	10	CC2	SA	A
ENDRIN		LLW,LLM	561	10	CC2	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D004		LLW,TRU,RES	559	90.56	103A	SA	A
D005		LLW,TRU,RES	559	90.56	103A	SA	A
D006		LLW,TRU,RES	559	90.56	103A	SA	A
D007		LLW,TRU,RES	559	90.56	103A	SA	A
D008	LEAD	LLW,TRU,RES	559	90.56	103A	SA	A
D009	MERCURY	LLW,TRU,RES	559	90.56	103A	SA	A
D010	SELENIUM	LLW,TRU,RES	559	90.56	103A	SA	A
D011	SILVER	LLW,TRU,RES	559	90.56	103A	SA	A
D018	BENZENE	LLW,TRU,RES	559	90.56	103A	SA	A
D019	CARBON TET	LLW,TRU,RES	559	90.56	103A	SA	A
D022	CHLOROFORM	LLW,TRU,RES	559	90.56	103A	SA	A
D028	1,4-DICHLOROETHANE	LLW,TRU,RES	559	90.56	103A	SA	A
D029	1,1-DICHLOROETHENE	LLW,TRU,RES	559	90.56	103A	SA	A
D035	MEK	LLW,TRU,RES	559	90.56	103A	SA	A
D038	PYRIDINE	LLW,TRU,RES	559	90.56	103A	SA	A
D040	TRICHLOROETHYLENE	LLW,TRU,RES	559	90.56	103A	SA	A
D043	VINYL CHLORIDE	LLW,TRU,RES	559	90.56	103A	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
D005		REM,TRM,LLM	559	90.101	102	SA	A
D006		REM,TRM,LLM	559	90.101	102	SA	A
D007		REM,TRM,LLM	559	90.101	102	SA	A
D008	LEAD	REM,TRM,LLM	559	90.101	102	SA	A
D043	VINYL CHLORIDE	REM	559	90.102	103	SA	A
D009	MERCURY	REM,TRM,LLM	559	90.101	102	SA	A
D010	SELENIUM	REM,TRM,LLM	559	90.101	102	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D011	SILVER	REM,TRM,LLM	559	90.101	102	SA	A
D018	BENZENE	REM,TRM,LLM	559	90.101	102	SA	A
D019	CARBON TET	REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM	559	90.102	103	SA	A
ENDRIN		REM	559	90.102	103	SA	A
ENDRIN		REM	559	90.102	103	SA	A
D022	CHLOROFORM	REM,TRM,LLM	559	90.101	102	SA	A
D028	1,4-DICHLOROETHANE	REM,TRM,LLM	559	90.101	102	SA	A
D035	MEK	REM,TRM,LLM	559	90.101	102	SA	A
D038	PYRIDINE	REM,TRM,LLM	559	90.101	102	SA	A
D040	TRICHLOROETHYLENE	REM,TRM,LLM	559	90.101	102	SA	A
D043	VINYL CHLORIDE	REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM	559	90.102	103	SA	A
ENDRIN		REM	559	90.102	103	SA	A
ENDRIN		REM	559	90.102	103	SA	A
ENDRIN		REM	559	90.102	103	SA	A
ENDRIN		REM	559	90.102	103	SA	A
D038	PYRIDINE	LLW,LLM,NON	561	10	CC9	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM,NON	561	10	CC9	SA	A
D043	VINYL CHLORIDE	LLW,LLM,NON	561	10	CC9	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D010	SELENIUM	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D011	SILVER	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D018	BENZENE	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D019	CARBON TET	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D022	CHLOROFORM	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
D028	1,4-DICHLOROETHANE	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D029	1,1-DICHLOROETHENE	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM	559	90.102	103	SA	A
D035	MEK	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D038	PYRIDINE	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D040	TRICHLOROETHYLENE	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D043	VINYL CHLORIDE	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D001		REM	559	90.102	103	SA	A
D002		REM	559	90.102	103	SA	A
D003		REM	559	90.102	103	SA	A
D004		REM	559	90.102	103	SA	A
D005		REM	559	90.102	103	SA	A
D006		REM	559	90.102	103	SA	A
D007		REM	559	90.102	103	SA	A
D008	LEAD	REM	559	90.102	103	SA	A
D009	MERCURY	REM	559	90.102	103	SA	A
D010	SELENIUM	REM	559	90.102	103	SA	A
D011	SILVER	REM	559	90.102	103	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
D001		REM,TRM,LLM	559	90.101	102	SA	A
D018	BENZENE	REM	559	90.102	103	SA	A
D019	CARBON TET	REM	559	90.102	103	SA	A
D022	CHLOROFORM	REM	559	90.102	103	SA	A
D028	1,4-DICHLOROETHANE	REM	559	90.102	103	SA	A
D029	1,1-DICHLOROETHENE	REM	559	90.102	103	SA	A
D035	MEK	REM	559	90.102	103	SA	A
D038	PYRIDINE	REM	559	90.102	103	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
D002		REM,TRM,LLM	559	90.101	102	SA	A
D003		REM,TRM,LLM	559	90.101	102	SA	A
D040	TRICHLOROETHYLENE	REM	559	90.102	103	SA	A
D004		REM,TRM,LLM	559	90.101	102	SA	A
D003		LLW,TRU,RES	559	90.56	103A	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D040	TRICHLOROETHYLENE		559	90.26	103E	SA	A
D043	VINYL CHLORIDE		559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
D001		REM,TRM,LLM	559	90.29	101	SA	A
D002		REM,TRM,LLM	559	90.29	101	SA	A
D003		REM,TRM,LLM	559	90.29	101	SA	A
D004		REM,TRM,LLM	559	90.29	101	SA	A
D005		REM,TRM,LLM	559	90.29	101	SA	A
D006		REM,TRM,LLM	559	90.29	101	SA	A
D007		REM,TRM,LLM	559	90.29	101	SA	A
D008	LEAD	REM,TRM,LLM	559	90.29	101	SA	A
D009	MERCURY	REM,TRM,LLM	559	90.29	101	SA	A
D010	SELENIUM	REM,TRM,LLM	559	90.29	101	SA	A
D011	SILVER	REM,TRM,LLM	559	90.29	101	SA	A
D018	BENZENE	REM,TRM,LLM	559	90.29	101	SA	A
D019	CARBON TET	REM,TRM,LLM	559	90.29	101	SA	A
D022	CHLOROFORM	REM,TRM,LLM	559	90.29	101	SA	A
D028	1,4-DICHLOROETHANE	REM,TRM,LLM	559	90.29	101	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D029	1,1-DICHLOROETHENE	REM,TRM,LLM	559	90.29	101	SA	A
D035	MEK	REM,TRM,LLM	559	90.29	101	SA	A
D040	TRICHLOROETHYLENE	REM,TRM,LLM	559	90.29	101	SA	A
D043	VINYL CHLORIDE	REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
D001		LLW,TRU,RES	559	90.56	103A	SA	A
D002		LLW,TRU,RES	559	90.56	103A	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
D001		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D002		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D003		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D004		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D005		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D006		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D007		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D008	LEAD	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D009	MERCURY	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA–REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D004		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
ENDRIN		REM	559	90.102	103	SA	A
D001			559	90.26	103E	SA	A
D002			559	90.26	103E	SA	A
D003			559	90.26	103E	SA	A
D004			559	90.26	103E	SA	A
D005			559	90.26	103E	SA	A
D006			559	90.26	103E	SA	A
D007			559	90.26	103E	SA	A
D008	LEAD		559	90.26	103E	SA	A
D009	MERCURY		559	90.26	103E	SA	A
D010	SELENIUM		559	90.26	103E	SA	A
D011	SILVER		559	90.26	103E	SA	A
D018	BENZENE		559	90.26	103E	SA	A
D019	CARBON TET		559	90.26	103E	SA	A
D022	CHLOROFORM		559	90.26	103E	SA	A
D028	1,4-DICHLOROETHANE		559	90.26	103E	SA	A
D029	1,1-DICHLOROETHENE		559	90.26	103E	SA	A
D035	MEK		559	90.26	103E	SA	A
D038	PYRIDINE		559	90.26	103E	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D005		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
D004		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D005		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A

APPENDIX 3.8

INDUSTRIAL AREA IM/IRA/DD

RCRA–REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
ENDRIN		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
ENDRIN		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
D022	CHLOROFORM	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D011	SILVER	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
D009	MERCURY	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
D008	LEAD	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
D007		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
D022	CHLOROFORM	LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
ENDRIN		LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
ENDRIN		LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
ENDRIN		LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D019	CARBON TET	LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D006		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
D008	LEAD	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
D007		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
D006		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
ENDRIN		NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
ENDRIN		NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
ENDRIN		NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D011	SILVER	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D019	CARBON TET	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A

RCRA–REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
D004		LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D004		NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D005		NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D006		NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D007		NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D008	LEAD	NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D011	SILVER	NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D005		LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
D006		LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
D007		LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
D008	LEAD	LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
D009	MERCURY	LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
D011	SILVER	LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
D009	MERCURY	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
ENDRIN		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
ENDRIN		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
ENDRIN		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
D022	CHLOROFORM	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
D019	CARBON TET	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
D001		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D022	CHLOROFORM	LLM,HAZ,LLW	551	18.06	NA	ST	A
D019	CARBON TET	LLM,HAZ,LLW	551	18.06	NA	ST	A
D011	SILVER	LLM,HAZ,LLW	551	18.06	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.01	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.06	NA	ST	A
D006		LLM,HAZ,LLW	551	18.01	NA	ST	A
D007		LLM,HAZ,LLW	551	18.06	NA	ST	A
D006		LLM,HAZ,LLW	551	18.06	NA	ST	A
D005		LLM,HAZ,LLW	551	18.06	NA	ST	A
D004		LLM,HAZ,LLW	551	18.06	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.05	NA	ST	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
D001		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA–REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D009	MERCURY	RES,REM,LAB	371	90.71	3511	SA	A
D010	SELENIUM	RES,REM,LAB	371	90.71	3511	SA	A
D011	SILVER	RES,REM,LAB	371	90.71	3511	SA	A
D019	CARBON TET	RES,REM,LAB	371	90.71	3511	SA	A
ENDRIN		RES,REM,LAB	371	90.71	3511	SA	A
ENDRIN		RES,REM,LAB	371	90.71	3511	SA	A
ENDRIN		RES,REM,LAB	371	90.71	3511	SA	A
ENDRIN		RES,REM,LAB	371	90.71	3511	SA	A
D001		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D002		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D003		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D004		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D005		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D006		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D007		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,NON	371	90.72	3202	SA	A
D001		RES,REM,LAB	371	90.73	3303	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.7	3341	SA	A

APPENDIX 3.8 FINAL

INDUSTRIAL AREA IM/IRA/DD

RCRA–REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC16	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D003		RES,REM,LAB	371	90.73	3303	SA	A
D004		RES,REM,LAB	371	90.73	3303	SA	A
D005		RES,REM,LAB	371	90.73	3303	SA	A
D006		RES,REM,LAB	371	90.73	3303	SA	A
D007		RES,REM,LAB	371	90.73	3303	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D008	LEAD	RES,REM,LAB	371	90.73	3303	SA	A
D001		RES,REM	371	90.100	STACKER	SA	A
D002		RES,REM	371	90.100	STACKER	SA	A
D003		RES,REM	371	90.100	STACKER	SA	A
D004		RES,REM	371	90.100	STACKER	SA	A
D005		RES,REM	371	90.100	STACKER	SA	A
D006		RES,REM	371	90.100	STACKER	SA	A
D007		RES,REM	371	90.100	STACKER	SA	A
D008	LEAD	RES,REM	371	90.100	STACKER	SA	A
D009	MERCURY	RES,REM	371	90.100	STACKER	SA	A
D010	SELENIUM	RES,REM	371	90.100	STACKER	SA	A
D011	SILVER	RES,REM	371	90.100	STACKER	SA	A
D019	CARBON TET	RES,REM	371	90.100	STACKER	SA	A
ENDRIN		RES,REM	371	90.100	STACKER	SA	A
ENDRIN		RES,REM	371	90.100	STACKER	SA	A
ENDRIN		RES,REM	371	90.100	STACKER	SA	A
ENDRIN		RES,REM	371	90.100	STACKER	SA	A
D001		REM	371	90.104	3305	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D019	CARBON TET	REM	371	90.104	GB-37C	SA	A
ENDRIN		REM	371	90.104	GB-37C	SA	A
ENDRIN		REM	371	90.104	GB-37C	SA	A
ENDRIN		REM	371	90.104	GB-37C	SA	A
ENDRIN		REM	371	90.104	GB-37C	SA	A
D009	MERCURY	RES,REM,LAB	371	90.73	3303	SA	A
D010	SELENIUM	RES,REM,LAB	371	90.73	3303	SA	A
D011	SILVER	RES,REM,LAB	371	90.73	3303	SA	A
D019	CARBON TET	RES,REM,LAB	371	90.73	3303	SA	A
ENDRIN		RES,REM,LAB	371	90.73	3303	SA	A
ENDRIN		RES,REM,LAB	371	90.73	3303	SA	A
ENDRIN		RES,REM,LAB	371	90.73	3303	SA	A
ENDRIN		RES,REM,LAB	371	90.73	3303	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D004		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D007		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.8	3567A	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D005		NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D006		NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D007		NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D008	LEAD	NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D011	SILVER	NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D005		LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
D006		LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
D007		LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
D008	LEAD	LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
D009	MERCURY	LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
D011	SILVER	LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
D009	MERCURY	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
ENDRIN		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
ENDRIN		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
ENDRIN		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
D022	CHLOROFORM	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
D019	CARBON TET	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D001		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.96	3204	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D004		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D035	MEK	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D007		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D018	BENZENE	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D022	CHLOROFORM	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D028	1,4-DICHLOROETHANE	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D029	1,1-DICHLOROETHENE	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D035	MEK	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D038	PYRIDINE	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D040	TRICHLOROETHYLENE	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D043	VINYL CHLORIDE	RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A
D038	PYRIDINE	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D040	TRICHLOROETHYLENE	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A
D043	VINYL CHLORIDE	LAB,LLW,LLM,REM,RES,STD,TRM,TRU,LLT	371	90.1	3189	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D011	SILVER	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D019	CARBON TET	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD,LLM,TRM	371	90.9	3206	SA	A
D001		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D002		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D003		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D004		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D005		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D006		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D001		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D002		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D003		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D004		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D005		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D006		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D007		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D008	LEAD	RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D009	MERCURY	RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D010	SELENIUM	RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D011	SILVER	RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D019	CARBON TET	RES,LAB,TRU,LLW	371	90.12	1101	SA	A
ENDRIN		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
ENDRIN		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
ENDRIN		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
ENDRIN		RES,LAB,TRU,LLW	371	90.12	1101	SA	A
D007		RES,REM,TRU,LLW,LAB,STD	371	90.94	3331	SA	A
D001		RES,REM,TRU,LLW,LAB,STD,TRM,LLM	371	90.14	1111	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
D022	CHLOROFORM	LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
ENDRIN		LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
ENDRIN		LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
ENDRIN		LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D019	CARBON TET	LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D006		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
D008	LEAD	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
D007		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
D006		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D003		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D004		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D005		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D006		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D007		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D011	SILVER	RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,STD	371	90.95	3327	SA	A
D001		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D002		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D003		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D004		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D005		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D006		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D007		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D008	LEAD	RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D009	MERCURY	RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D010	SELENIUM	RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D011	SILVER	RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
D019	CARBON TET	RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
ENDRIN		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
ENDRIN		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
ENDRIN		RES,LAB,TRU,LLW,REM,TRM,LLM	371	90.15	1208	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	371	90.18	3412	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC10	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
ENDRIN		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
ENDRIN		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
D006		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
ENDRIN		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
ENDRIN		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
ENDRIN		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
ENDRIN		HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
D011	SILVER	HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
D010	SELENIUM	HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
D009	MERCURY	HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
D008	LEAD	HAZ,LLW,LLM,TRU,TRM,EMT	374	42.77	2804	TA	A
D010	SELENIUM	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D005		LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D002		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D029	1,1-DICHLOROETHENE	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D035	MEK	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D038	PYRIDINE	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D040	TRICHLOROETHYLENE	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D043	VINYL CHLORIDE	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
ENDRIN		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
ENDRIN		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
ENDRIN		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
ENDRIN		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D028	1,4-DICHLOROETHANE	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D001		LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D002		LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
ENDRIN		REM	559	90.102	103	SA	A
D001			559	90.26	103E	SA	A
D002			559	90.26	103E	SA	A
D003			559	90.26	103E	SA	A
D004			559	90.26	103E	SA	A
D005			559	90.26	103E	SA	A
D006			559	90.26	103E	SA	A
D007			559	90.26	103E	SA	A
D008	LEAD		559	90.26	103E	SA	A
D009	MERCURY		559	90.26	103E	SA	A
D010	SELENIUM		559	90.26	103E	SA	A
D011	SILVER		559	90.26	103E	SA	A
D018	BENZENE		559	90.26	103E	SA	A
D019	CARBON TET		559	90.26	103E	SA	A
D022	CHLOROFORM		559	90.26	103E	SA	A
D028	1,4-DICHLOROETHANE		559	90.26	103E	SA	A
D029	1,1-DICHLOROETHENE		559	90.26	103E	SA	A
D035	MEK		559	90.26	103E	SA	A
D038	PYRIDINE		559	90.26	103E	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
ENDRIN		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
ENDRIN		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
ENDRIN		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
ENDRIN		LLW,TRU,LLM,TRM,NON,LAB	374	19	3813	SA	A
D001		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D011	SILVER	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D018	BENZENE	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D019	CARBON TET	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D028	1,4-DICHLOROETHANE	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D029	1,1-DICHLOROETHENE	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D035	MEK	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D038	PYRIDINE	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D040	TRICHLOROETHYLENE	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D043	VINYL CHLORIDE	LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
ENDRIN		LLM,HAZ,LLW	374	43.01	SE_OF_374-T231A	ST	A
D018	BENZENE	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
ENDRIN		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
ENDRIN		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
ENDRIN		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D004		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D005		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D006		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D007		LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D008	LEAD	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D009	MERCURY	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A
D010	SELENIUM	LLM,HAZ,LLW	374	43.02	SE_3717-T231B	ST	A

INDUSTRIAL AREA IM/IRA/DD

RCRA–REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D029	1,1–DICHLOROETHENE	REM,TRM,LLM	559	90.29	101	SA	A
D035	MEK	REM,TRM,LLM	559	90.29	101	SA	A
D040	TRICHLOROETHYLENE	REM,TRM,LLM	559	90.29	101	SA	A
D043	VINYL CHLORIDE	REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
ENDRIN		REM,TRM,LLM	559	90.29	101	SA	A
D001		LLW,TRU,RES	559	90.56	103A	SA	A
D002		LLW,TRU,RES	559	90.56	103A	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
D001		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D002		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D003		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D004		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D005		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D006		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D007		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D008	LEAD	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D009	MERCURY	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA–REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T–3	ST	A
D002		LLM,HAZ,LLW	444	39.01	10	ST	A
ENDRIN		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T–3	ST	A
ENDRIN		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T–3	ST	A
ENDRIN		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T–3	ST	A
ENDRIN		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T–3	ST	A
ENDRIN		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T–3	ST	A
ENDRIN		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T–3	ST	A
D029	1,1–DICHLOROETHENE	LLM,HAZ,LLW	444	39.01	10	ST	A
D001		LLM,HAZ,LLW	444	39.01	10	ST	A
D038	PYRIDINE	LLM,HAZ,LLW	444	39.01	10	ST	A
D004		LLM,HAZ,LLW	444	39.01	10	ST	A
D005		LLM,HAZ,LLW	444	39.01	10	ST	A
D007		LLM,HAZ,LLW	444	39.01	10	ST	A
D005		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T–3	ST	A
D018	BENZENE	LLM,HAZ,LLW	444	39.01	10	ST	A
D019	CARBON TET	LLM,HAZ,LLW	444	39.01	10	ST	A
D028	1,4–DICHLOROETHANE	LLM,HAZ,LLW	444	39.01	10	ST	A
D002		TRU,LLM,HAZ,TRM,LLW	444	40.06	CN_T–3	ST	A
D035	MEK	LLM,HAZ,LLW	444	39.01	10	ST	A
ENDRIN		LLM,LLW	447	30	510	SA	A
D038	PYRIDINE	LLM,LLW	447	30	510	SA	A
ENDRIN		LLM,LAB	447	6	501	SA	A
D002		LLM,HAZ,LLW	447	39.02	NA	TA	A
D004		LLM,HAZ,LLW	447	39.02	NA	TA	A
D019	CARBON TET	LLM,LLW	447	30	510	SA	A
D028	1,4–DICHLOROETHANE	LLM,LLW	447	30	510	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D001		REM	559	90.102	103	SA	A
D002		REM	559	90.102	103	SA	A
D003		REM	559	90.102	103	SA	A
D004		REM	559	90.102	103	SA	A
D005		REM	559	90.102	103	SA	A
D006		REM	559	90.102	103	SA	A
D007		REM	559	90.102	103	SA	A
D008	LEAD	REM	559	90.102	103	SA	A
D009	MERCURY	REM	559	90.102	103	SA	A
D010	SELENIUM	REM	559	90.102	103	SA	A
D011	SILVER	REM	559	90.102	103	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
D001		REM,TRM,LLM	559	90.101	102	SA	A
D018	BENZENE	REM	559	90.102	103	SA	A
D019	CARBON TET	REM	559	90.102	103	SA	A
D022	CHLOROFORM	REM	559	90.102	103	SA	A
D028	1,4-DICHLOROETHANE	REM	559	90.102	103	SA	A
D029	1,1-DICHLOROETHENE	REM	559	90.102	103	SA	A
D035	MEK	REM	559	90.102	103	SA	A
D038	PYRIDINE	REM	559	90.102	103	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
D002		REM,TRM,LLM	559	90.101	102	SA	A
D003		REM,TRM,LLM	559	90.101	102	SA	A
D040	TRICHLOROETHYLENE	REM	559	90.102	103	SA	A
D004		REM,TRM,LLM	559	90.101	102	SA	A
D003		LLW,TRU,RES	559	90.56	103A	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D043	VINYL CHLORIDE	LLM,LAB	447	6	501	SA	A
ENDRIN		LLM,HAZ,LLW	447	39.02	NA	TA	A
ENDRIN		LLM	447	30	501	TA	A
D001		LLM,LAB	447	6	501	SA	A
D001		LLM,HAZ,LLW	447	39.02	NA	TA	A
D001		LLM,LLW	447	30	510	SA	A
D019	CARBON TET	LLM,LAB	447	6	501	SA	A
D028	1,4-DICHLOROETHANE	LLM,LAB	447	6	501	SA	A
D029	1,1-DICHLOROETHENE	LLM,LAB	447	6	501	SA	A
D035	MEK	LLM,LAB	447	6	501	SA	A
D038	PYRIDINE	LLM,LAB	447	6	501	SA	A
D040	TRICHLOROETHYLENE	LLM,LAB	447	6	501	SA	A
		LAB,HAZ,LLW	460	39.03	140	TA	A
D004		LLM,HAZ,LLW	551	18.01	NA	ST	A
D006		LLM,HAZ,LLW	551	18.05	NA	ST	A
D005		LLM,HAZ,LLW	551	18.05	NA	ST	A
D004		LLM,HAZ,LLW	551	18.05	NA	ST	A
D008	LEAD	LLM,HAZ,LLW	551	18.06	NA	ST	A
D022	CHLOROFORM	LLM,HAZ,LLW	551	18.05	NA	ST	A
D008	LEAD	LLM,HAZ,LLW	551	18.01	NA	ST	A
D007		LLM,HAZ,LLW	551	18.01	NA	ST	A
D007		LLM,HAZ,LLW	551	18.05	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.05	NA	ST	A
D008	LEAD	LLM,HAZ,LLW	551	18.05	NA	ST	A
D005		LLM,HAZ,LLW	551	18.01	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.06	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.05	NA	ST	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D011	SILVER	REM,TRM,LLM	559	90.101	102	SA	A
D018	BENZENE	REM,TRM,LLM	559	90.101	102	SA	A
D019	CARBON TET	REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM	559	90.102	103	SA	A
ENDRIN		REM	559	90.102	103	SA	A
ENDRIN		REM	559	90.102	103	SA	A
D022	CHLOROFORM	REM,TRM,LLM	559	90.101	102	SA	A
D028	1,4-DICHLOROETHANE	REM,TRM,LLM	559	90.101	102	SA	A
D035	MEK	REM,TRM,LLM	559	90.101	102	SA	A
D038	PYRIDINE	REM,TRM,LLM	559	90.101	102	SA	A
D040	TRICHLOROETHYLENE	REM,TRM,LLM	559	90.101	102	SA	A
D043	VINYL CHLORIDE	REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM	559	90.102	103	SA	A
ENDRIN		REM	559	90.102	103	SA	A
ENDRIN		REM	559	90.102	103	SA	A
ENDRIN		REM	559	90.102	103	SA	A
ENDRIN		REM	559	90.102	103	SA	A
D038	PYRIDINE	LLW,LLM,NON	561	10	CC9	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM,NON	561	10	CC9	SA	A
D043	VINYL CHLORIDE	LLW,LLM,NON	561	10	CC9	SA	A

APPENDIX 3.8

INDUSTRIAL AREA IM/IRA/DD

RCRA–REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D022	CHLOROFORM	LLM,HAZ,LLW	551	18.06	NA	ST	A
D019	CARBON TET	LLM,HAZ,LLW	551	18.06	NA	ST	A
D011	SILVER	LLM,HAZ,LLW	551	18.06	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.01	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.06	NA	ST	A
D006		LLM,HAZ,LLW	551	18.01	NA	ST	A
D007		LLM,HAZ,LLW	551	18.06	NA	ST	A
D006		LLM,HAZ,LLW	551	18.06	NA	ST	A
D005		LLM,HAZ,LLW	551	18.06	NA	ST	A
D004		LLM,HAZ,LLW	551	18.06	NA	ST	A
ENDRIN		LLM,HAZ,LLW	551	18.05	NA	ST	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC14	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC15	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D001		LLW,LLM	561	10	CC2	SA	A
D002		LLW,LLM	561	10	CC2	SA	A
D003		LLW,LLM	561	10	CC2	SA	A
D004		LLW,LLM	561	10	CC2	SA	A
D005		LLW,LLM	561	10	CC2	SA	A
D006		LLW,LLM	561	10	CC2	SA	A
D007		LLW,LLM	561	10	CC2	SA	A
D010	SELENIUM	LLM,NON	561	10	OUTSIDE	SA	A
D011	SILVER	LLM,NON	561	10	OUTSIDE	SA	A
D018	BENZENE	LLM,NON	561	10	OUTSIDE	SA	A
D019	CARBON TET	LLM,NON	561	10	OUTSIDE	SA	A
D028	1,4-DICHLOROETHANE	LLM,NON	561	10	OUTSIDE	SA	A
D008	LEAD	LLW,LLM	561	10	CC2	SA	A
D009	MERCURY	LLW,LLM	561	10	CC2	SA	A
D010	SELENIUM	LLW,LLM	561	10	CC2	SA	A
D011	SILVER	LLW,LLM	561	10	CC2	SA	A
D018	BENZENE	LLW,LLM	561	10	CC2	SA	A
D019	CARBON TET	LLW,LLM	561	10	CC2	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM	561	10	CC2	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM	561	10	CC2	SA	A
D035	MEK	LLW,LLM	561	10	CC2	SA	A
D038	PYRIDINE	LLW,LLM	561	10	CC2	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM	561	10	CC2	SA	A
D043	VINYL CHLORIDE	LLW,LLM	561	10	CC2	SA	A
ENDRIN		LLW,LLM	561	10	CC2	SA	A
ENDRIN		LLW,LLM	561	10	CC2	SA	A
ENDRIN		LLW,LLM	561	10	CC2	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC21	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC17	SA	A
D001		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC18	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC19	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLW,LLM	561	10	CC3	SA	A
D029	1,1-DICHLOROETHENE	LLM,NON	561	10	OUTSIDE	SA	A
D035	MEK	LLM,NON	561	10	OUTSIDE	SA	A
D038	PYRIDINE	LLM,NON	561	10	OUTSIDE	SA	A
D040	TRICHLOROETHYLENE	LLM,NON	561	10	OUTSIDE	SA	A
D043	VINYL CHLORIDE	LLM,NON	561	10	OUTSIDE	SA	A
ENDRIN		LLW,LLM	561	10	CC3	SA	A
ENDRIN		LLM,NON	561	10	OUTSIDE	SA	A
ENDRIN		LLM,NON	561	10	OUTSIDE	SA	A
ENDRIN		LLM,NON	561	10	OUTSIDE	SA	A
ENDRIN		LLM,NON	561	10	OUTSIDE	SA	A
ENDRIN		LLM,NON	561	10	OUTSIDE	SA	A
ENDRIN		LLM,NON	561	10	OUTSIDE	SA	A
ENDRIN		LLM,NON	561	10	OUTSIDE	SA	A
ENDRIN		LLM,NON	561	10	OUTSIDE	SA	A
D001		LLW,LLM	561	10	CC1	SA	A
D002		LLW,LLM	561	10	CC1	SA	A
D003		LLW,LLM	561	10	CC1	SA	A
D004		LLW,LLM	561	10	CC1	SA	A
D005		LLW,LLM	561	10	CC1	SA	A
D006		LLW,LLM	561	10	CC1	SA	A
D007		LLW,LLM	561	10	CC1	SA	A
D008	LEAD	LLW,LLM	561	10	CC1	SA	A
D009	MERCURY	LLW,LLM	561	10	CC1	SA	A
D010	SELENIUM	LLW,LLM	561	10	CC1	SA	A
D011	SILVER	LLW,LLM	561	10	CC1	SA	A
D018	BENZENE	LLW,LLM	561	10	CC1	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC3	SA	A
D004		LLW,LLM,NON,HAZ,LAB	551PAD	18.03	CC4	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC8	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC9	SA	A
D004		NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLW,LLM	561	10	CC4	SA	A
ENDRIN		LLW,LLM	561	10	CC4	SA	A
ENDRIN		LLW,LLM	561	10	CC4	SA	A
ENDRIN		LLW,LLM	561	10	CC4	SA	A
ENDRIN		LLW,LLM	561	10	CC4	SA	A
ENDRIN		LLW,LLM	561	10	CC4	SA	A
ENDRIN		LLW,LLM	561	10	CC4	SA	A
ENDRIN		LLW,LLM	561	10	CC4	SA	A
D001		LLW,LLM,NON	561	10	CC5	SA	A
D002		LLW,LLM,NON	561	10	CC5	SA	A
D003		LLW,LLM,NON	561	10	CC5	SA	A
D004		LLW,LLM,NON	561	10	CC5	SA	A
D005		LLW,LLM,NON	561	10	CC5	SA	A
D006		LLW,LLM,NON	561	10	CC5	SA	A
D007		LLW,LLM,NON	561	10	CC5	SA	A
D008	LEAD	LLW,LLM,NON	561	10	CC5	SA	A
D009	MERCURY	LLW,LLM,NON	561	10	CC5	SA	A
D010	SELENIUM	LLW,LLM,NON	561	10	CC5	SA	A
D011	SILVER	LLW,LLM,NON	561	10	CC5	SA	A
D018	BENZENE	LLW,LLM,NON	561	10	CC5	SA	A
D019	CARBON TET	LLW,LLM,NON	561	10	CC5	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM,NON	561	10	CC5	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM,NON	561	10	CC5	SA	A
D035	MEK	LLW,LLM,NON	561	10	CC5	SA	A
D038	PYRIDINE	LLW,LLM,NON	561	10	CC5	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM,NON	561	10	CC5	SA	A
D043	VINYL CHLORIDE	LLW,LLM,NON	561	10	CC5	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC5	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
ENDRIN		NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
ENDRIN		NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
ENDRIN		NON,HAZ,LLW,LLM	551PAD	18.03	OUTSIDE	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC6	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLW,LLM,NON	561	10	CC6	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC6	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC6	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC6	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC6	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC6	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC6	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC6	SA	A
D001		LLM,LLW,NON	561	10	CC7	SA	A
D002		LLM,LLW,NON	561	10	CC7	SA	A
D003		LLM,LLW,NON	561	10	CC7	SA	A
D004		LLM,LLW,NON	561	10	CC7	SA	A
D005		LLM,LLW,NON	561	10	CC7	SA	A
D006		LLM,LLW,NON	561	10	CC7	SA	A
D007		LLM,LLW,NON	561	10	CC7	SA	A
D008	LEAD	LLM,LLW,NON	561	10	CC7	SA	A
D009	MERCURY	LLM,LLW,NON	561	10	CC7	SA	A
D010	SELENIUM	LLM,LLW,NON	561	10	CC7	SA	A
D011	SILVER	LLM,LLW,NON	561	10	CC7	SA	A
D018	BENZENE	LLM,LLW,NON	561	10	CC7	SA	A
D019	CARBON TET	LLM,LLW,NON	561	10	CC7	SA	A
D028	1,4-DICHLOROETHANE	LLM,LLW,NON	561	10	CC7	SA	A
D029	1,1-DICHLOROETHENE	LLM,LLW,NON	561	10	CC7	SA	A
D035	MEK	LLM,LLW,NON	561	10	CC7	SA	A
D038	PYRIDINE	LLM,LLW,NON	561	10	CC7	SA	A
D040	TRICHLOROETHYLENE	LLM,LLW,NON	561	10	CC7	SA	A
D043	VINYL CHLORIDE	LLM,LLW,NON	561	10	CC7	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
ENDRIN		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
ENDRIN		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
D022	CHLOROFORM	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D011	SILVER	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
D009	MERCURY	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
D008	LEAD	HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
D007		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC7	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC2	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC20	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLW,LLM,NON	561	10	CC8	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC8	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC8	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC8	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC8	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC8	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC8	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC8	SA	A
D001		LLW,LLM,NON	561	10	CC9	SA	A
D002		LLW,LLM,NON	561	10	CC9	SA	A
D003		LLW,LLM,NON	561	10	CC9	SA	A
D004		LLW,LLM,NON	561	10	CC9	SA	A
D005		LLW,LLM,NON	561	10	CC9	SA	A
D006		LLW,LLM,NON	561	10	CC9	SA	A
D007		LLW,LLM,NON	561	10	CC9	SA	A
D008	LEAD	LLW,LLM,NON	561	10	CC9	SA	A
D009	MERCURY	LLW,LLM,NON	561	10	CC9	SA	A
D010	SELENIUM	LLW,LLM,NON	561	10	CC9	SA	A
D011	SILVER	LLW,LLM,NON	561	10	CC9	SA	A
D018	BENZENE	LLW,LLM,NON	561	10	CC9	SA	A
D019	CARBON TET	LLW,LLM,NON	561	10	CC9	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM,NON	561	10	CC9	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM,NON	561	10	CC9	SA	A
D035	MEK	LLW,LLM,NON	561	10	CC9	SA	A
D005		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D018	BENZENE	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D043	VINYL CHLORIDE	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D005		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
D004		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC25	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC24	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC26	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC27	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	TENT1	SA	A
D005		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC22	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC1	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D019	CARBON TET	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D022	CHLOROFORM	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D010	SELENIUM	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D001		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D004		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D009	MERCURY	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D008	LEAD	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D007		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D006		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D005		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D003		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D002		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D001		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D043	VINYL CHLORIDE	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D040	TRICHLOROETHYLENE	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D038	PYRIDINE	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D038	PYRIDINE	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D002		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC11	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D004		HAZ,NON,LLW,LLM,LAB	551PAD	18.03	CC23	SA	A
D019	CARBON TET	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D022	CHLOROFORM	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
ENDRIN		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC12	SA	A
D004		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D005		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D006		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D007		NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D008	LEAD	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D009	MERCURY	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A
D011	SILVER	NON,HAZ,LLW,LLM,LAB	551PAD	18.03	CC13	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D018	BENZENE	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D029	1,1-DICHLOROETHENE	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D028	1,4-DICHLOROETHANE	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D038	PYRIDINE		707	90.105	130B	SA	A
D040	TRICHLOROETHYLENE		707	90.105	130B	SA	A
D043	VINYL CHLORIDE		707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
ENDRIN			707	90.1[illegible]	130B	SA	A
ENDRIN			707	90.105	130B	SA	A
D001		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D002		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D003		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D005		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D006		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D007		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D008	LEAD	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D009	MERCURY	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D010	SELENIUM	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D011	SILVER	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D018	BENZENE	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D040	TRICHLOROETHYLENE		559	90.26	103E	SA	A
D043	VINYL CHLORIDE		559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
ENDRIN			559	90.26	103E	SA	A
D001		REM,TRM,LLM	559	90.29	101	SA	A
D002		REM,TRM,LLM	559	90.29	101	SA	A
D003		REM,TRM,LLM	559	90.29	101	SA	A
D004		REM,TRM,LLM	559	90.29	101	SA	A
D005		REM,TRM,LLM	559	90.29	101	SA	A
D006		REM,TRM,LLM	559	90.29	101	SA	A
D007		REM,TRM,LLM	559	90.29	101	SA	A
D008	LEAD	REM,TRM,LLM	559	90.29	101	SA	A
D009	MERCURY	REM,TRM,LLM	559	90.29	101	SA	A
D010	SELENIUM	REM,TRM,LLM	559	90.29	101	SA	A
D011	SILVER	REM,TRM,LLM	559	90.29	101	SA	A
D018	BENZENE	REM,TRM,LLM	559	90.29	101	SA	A
D019	CARBON TET	REM,TRM,LLM	559	90.29	101	SA	A
D022	CHLOROFORM	REM,TRM,LLM	559	90.29	101	SA	A
D028	1,4-DICHLOROETHANE	REM,TRM,LLM	559	90.29	101	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D001			707	90.146	MOD_C_GB_C-40	SA	A
D002			707	90.146	MOD_C_GB_C-40	SA	A
D003			707	90.146	MOD_C_GB_C-40	SA	A
D005			707	90.146	MOD_C_GB_C-40	SA	A
D006			707	90.146	MOD_C_GB_C-40	SA	A
D007			707	90.146	MOD_C_GB_C-40	SA	A
D008	LEAD		707	90.146	MOD_C_GB_C-40	SA	A
D009	MERCURY		707	90.146	MOD_C_GB_C-40	SA	A
D010	SELENIUM		707	90.146	MOD_C_GB_C-40	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.28	E-AND-F-HALL	SA	A
D001			707	90.105	130B	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.28	E-AND-F-HALL	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.28	E-AND-F-HALL	SA	A
D002			707	90.105	130B	SA	A
D003			707	90.105	130B	SA	A
D004			707	90.105	130B	SA	A
D005			707	90.105	130B	SA	A
D006			707	90.105	130B	SA	A
D007			707	90.105	130B	SA	A
D008	LEAD		707	90.105	130B	SA	A
D009	MERCURY		707	90.105	130B	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D010	SELENIUM	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D011	SILVER	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D018	BENZENE	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D019	CARBON TET	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D022	CHLOROFORM	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
D028	1,4-DICHLOROETHANE	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D029	1,1-DICHLOROETHENE	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,LLM	559	90.101	102	SA	A
ENDRIN		REM	559	90.102	103	SA	A
D035	MEK	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D038	PYRIDINE	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D040	TRICHLOROETHYLENE	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
D043	VINYL CHLORIDE	REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM,LLW	559	90.101	102_GB	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D006		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D007		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D008	LEAD	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D009	MERCURY	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D010	SELENIUM	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D011	SILVER	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D018	BENZENE	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D019	CARBON TET	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D028	1,4-DICHLOROETHANE	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D035	MEK	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D040	TRICHLOROETHYLENE	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D043	VINYL CHLORIDE	REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
ENDRIN		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
ENDRIN		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
ENDRIN		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
ENDRIN		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
ENDRIN		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
ENDRIN		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D003		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D005		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D006		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D007		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D008	LEAD	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D009	MERCURY	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D010	SELENIUM	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D004		LLW,TRU,RES	559	90.56	103A	SA	A
D005		LLW,TRU,RES	559	90.56	103A	SA	A
D006		LLW,TRU,RES	559	90.56	103A	SA	A
D007		LLW,TRU,RES	559	90.56	103A	SA	A
D008	LEAD	LLW,TRU,RES	559	90.56	103A	SA	A
D009	MERCURY	LLW,TRU,RES	559	90.56	103A	SA	A
D010	SELENIUM	LLW,TRU,RES	559	90.56	103A	SA	A
D011	SILVER	LLW,TRU,RES	559	90.56	103A	SA	A
D018	BENZENE	LLW,TRU,RES	559	90.56	103A	SA	A
D019	CARBON TET	LLW,TRU,RES	559	90.56	103A	SA	A
D022	CHLOROFORM	LLW,TRU,RES	559	90.56	103A	SA	A
D028	1,4-DICHLOROETHANE	LLW,TRU,RES	559	90.56	103A	SA	A
D029	1,1-DICHLOROETHENE	LLW,TRU,RES	559	90.56	103A	SA	A
D035	MEK	LLW,TRU,RES	559	90.56	103A	SA	A
D038	PYRIDINE	LLW,TRU,RES	559	90.56	103A	SA	A
D040	TRICHLOROETHYLENE	LLW,TRU,RES	559	90.56	103A	SA	A
D043	VINYL CHLORIDE	LLW,TRU,RES	559	90.56	103A	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
ENDRIN		LLW,TRU,RES	559	90.56	103A	SA	A
D005		REM,TRM,LLM	559	90.101	102	SA	A
D006		REM,TRM,LLM	559	90.101	102	SA	A
D007		REM,TRM,LLM	559	90.101	102	SA	A
D008	LEAD	REM,TRM,LLM	559	90.101	102	SA	A
D043	VINYL CHLORIDE	REM	559	90.102	103	SA	A
D009	MERCURY	REM,TRM,LLM	559	90.101	102	SA	A
D010	SELENIUM	REM,TRM,LLM	559	90.101	102	SA	A

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLW,LLM,NON	561	10	CC9	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC9	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC9	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC9	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC9	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC9	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC9	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC9	SA	A
D001		LLM,NON	561	10	OUTSIDE	SA	A
D002		LLM,NON	561	10	OUTSIDE	SA	A
D003		LLM,NON	561	10	OUTSIDE	SA	A
D004		LLM,NON	561	10	OUTSIDE	SA	A
D005		LLM,NON	561	10	OUTSIDE	SA	A
D006		LLM,NON	561	10	OUTSIDE	SA	A
D007		LLM,NON	561	10	OUTSIDE	SA	A
D008	LEAD	LLM,NON	561	10	OUTSIDE	SA	A
D009	MERCURY	LLM,NON	561	10	OUTSIDE	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM	561	10	CC1	SA	A
D043	VINYL CHLORIDE	LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC1	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLW,LLM	561	10	CC2	SA	A
ENDRIN		LLW,LLM	561	10	CC2	SA	A
ENDRIN		LLW,LLM	561	10	CC2	SA	A
ENDRIN		LLW,LLM	561	10	CC2	SA	A
ENDRIN		LLW,LLM	561	10	CC2	SA	A
D001		LLW,LLM	561	10	CC3	SA	A
D002		LLW,LLM	561	10	CC3	SA	A
D003		LLW,LLM	561	10	CC3	SA	A
D004		LLW,LLM	561	10	CC3	SA	A
D005		LLW,LLM	561	10	CC3	SA	A
D006		LLW,LLM	561	10	CC3	SA	A
D007		LLW,LLM	561	10	CC3	SA	A
D008	LEAD	LLW,LLM	561	10	CC3	SA	A
D009	MERCURY	LLW,LLM	561	10	CC3	SA	A
D010	SELENIUM	LLW,LLM	561	10	CC3	SA	A
D011	SILVER	LLW,LLM	561	10	CC3	SA	A
D018	BENZENE	LLW,LLM	561	10	CC3	SA	A
D019	CARBON TET	LLW,LLM	561	10	CC3	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM	561	10	CC3	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM	561	10	CC3	SA	A
D035	MEK	LLW,LLM	561	10	CC3	SA	A
D038	PYRIDINE	LLW,LLM	561	10	CC3	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM	561	10	CC3	SA	A
D043	VINYL CHLORIDE	LLW,LLM	561	10	CC3	SA	A
ENDRIN		LLW,LLM	561	10	CC3	SA	A
ENDRIN		LLW,LLM	561	10	CC3	SA	A
ENDRIN		LLW,LLM	561	10	CC3	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D019	CARBON TET	LLW,LLM	561	10	CC1	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM	561	10	CC1	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM	561	10	CC1	SA	A
D038	PYRIDINE	LLW,LLM	561	10	CC1	SA	A
D035	MEK	LLW,LLM	561	10	CC1	SA	A
ENDRIN		LLW,LLM	561	10	CC3	SA	A
ENDRIN		LLW,LLM	561	10	CC3	SA	A
ENDRIN		LLW,LLM	561	10	CC3	SA	A
D001		LLW,LLM	561	10	CC4	SA	A
D002		LLW,LLM	561	10	CC4	SA	A
D003		LLW,LLM	561	10	CC4	SA	A
D004		LLW,LLM	561	10	CC4	SA	A
D005		LLW,LLM	561	10	CC4	SA	A
D006		LLW,LLM	561	10	CC4	SA	A
D007		LLW,LLM	561	10	CC4	SA	A
D008	LEAD	LLW,LLM	561	10	CC4	SA	A
D009	MERCURY	LLW,LLM	561	10	CC4	SA	A
D010	SELENIUM	LLW,LLM	561	10	CC4	SA	A
D011	SILVER	LLW,LLM	561	10	CC4	SA	A
D018	BENZENE	LLW,LLM	561	10	CC4	SA	A
D019	CARBON TET	LLW,LLM	561	10	CC4	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM	561	10	CC4	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM	561	10	CC4	SA	A
D035	MEK	LLW,LLM	561	10	CC4	SA	A
D038	PYRIDINE	LLW,LLM	561	10	CC4	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM	561	10	CC4	SA	A
D043	VINYL CHLORIDE	LLW,LLM	561	10	CC4	SA	A

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLW,LLM,NON	561	10	CC5	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC5	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC5	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC5	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC5	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC5	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC5	SA	A
ENDRIN		LLW,LLM,NON	561	10	CC5	SA	A
D001		LLW,LLM,NON	561	10	CC6	SA	A
D002		LLW,LLM,NON	561	10	CC6	SA	A
D003		LLW,LLM,NON	561	10	CC6	SA	A
D004		LLW,LLM,NON	561	10	CC6	SA	A
D005		LLW,LLM,NON	561	10	CC6	SA	A
D006		LLW,LLM,NON	561	10	CC6	SA	A
D007		LLW,LLM,NON	561	10	CC6	SA	A
D008	LEAD	LLW,LLM,NON	561	10	CC6	SA	A
D009	MERCURY	LLW,LLM,NON	561	10	CC6	SA	A
D010	SELENIUM	LLW,LLM,NON	561	10	CC6	SA	A
D011	SILVER	LLW,LLM,NON	561	10	CC6	SA	A
D018	BENZENE	LLW,LLM,NON	561	10	CC6	SA	A
D019	CARBON TET	LLW,LLM,NON	561	10	CC6	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM,NON	561	10	CC6	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM,NON	561	10	CC6	SA	A
D035	MEK	LLW,LLM,NON	561	10	CC6	SA	A
D038	PYRIDINE	LLW,LLM,NON	561	10	CC6	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM,NON	561	10	CC6	SA	A
D043	VINYL CHLORIDE	LLW,LLM,NON	561	10	CC6	SA	A

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range 70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000, P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME: SHIFT SUPERINTENDENT

PHONE: (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: [ ] Pure [X] Mix

Chemical Name: OIL

EHS Name:

[ ] Solid [X] Liquid [ ] Gas [ ] EHS

Physical And Health Hazards

[X] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[ ] Immediate (acute)
[ ] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	444, 460/CRUSH, 881, 707/200
C	4	1	460/230, 707/200
F	4	1	707,777,374
N	4	1	779,707,705,771

INDUSTRIAL AREA IM/IRA/DD

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
ENDRIN		LLM,LLW,NON	561	10	CC7	SA	A
ENDRIN		LLM,LLW,NON	561	10	CC7	SA	A
ENDRIN		LLM,LLW,NON	561	10	CC7	SA	A
ENDRIN		LLM,LLW,NON	561	10	CC7	SA	A
ENDRIN		LLM,LLW,NON	561	10	CC7	SA	A
ENDRIN		LLM,LLW,NON	561	10	CC7	SA	A
ENDRIN		LLM,LLW,NON	561	10	CC7	SA	A
ENDRIN		LLM,LLW,NON	561	10	CC7	SA	A
D001		LLW,LLM,NON	561	10	CC8	SA	A
D002		LLW,LLM,NON	561	10	CC8	SA	A
D003		LLW,LLM,NON	561	10	CC8	SA	A
D004		LLW,LLM,NON	561	10	CC8	SA	A
D005		LLW,LLM,NON	561	10	CC8	SA	A
D006		LLW,LLM,NON	561	10	CC8	SA	A
D007		LLW,LLM,NON	561	10	CC8	SA	A
D008	LEAD	LLW,LLM,NON	561	10	CC8	SA	A
D009	MERCURY	LLW,LLM,NON	561	10	CC8	SA	A
D010	SELENIUM	LLW,LLM,NON	561	10	CC8	SA	A
D011	SILVER	LLW,LLM,NON	561	10	CC8	SA	A
D018	BENZENE	LLW,LLM,NON	561	10	CC8	SA	A
D019	CARBON TET	LLW,LLM,NON	561	10	CC8	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM,NON	561	10	CC8	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM,NON	561	10	CC8	SA	A
D035	MEK	LLW,LLM,NON	561	10	CC8	SA	A
D038	PYRIDINE	LLW,LLM,NON	561	10	CC8	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM,NON	561	10	CC8	SA	A
D043	VINYL CHLORIDE	LLW,LLM,NON	561	10	CC8	SA	A

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range 70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address: U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address: EG&G Rocky Flats, Inc. Phone 303-966-7000, P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS [ ] Pure [X] Mix

Chemical Name: OIL, VACUUM PUMP

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[ ] Immediate (acute)
[ ] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	460/132,440
D	4	1	776/207, T707S
M	4	1	559/103,779/141C
N	4	1	559/103, 708, 779, 707/125, 444/15, 777/452, 991/110, 776/158
R	4	1	559/103
C	4	1	460

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D001		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D002		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D010	SELENIUM	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D011	SILVER	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D019	CARBON TET	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D028	1,4-DICHLOROETHANE	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D029	1,1-DICHLOROETHENE	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D035	MEK	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D038	PYRIDINE	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D006		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D004		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D008	LEAD	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D009	MERCURY	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D007		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D040	TRICHLOROETHYLENE	LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
D003		LAB,TRM,NON,STD,TRU,LLW	569	59	ALL	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D011	SILVER	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 1314-56-3 [X] Pure [ ] Mix

Chemical Name: PHOSPHORUS PENTOXIDE

EHS Name: PHOSPHORUS PENTOXIDE

[X] Solid
[X] Liquid
[ ] Gas
[X] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

01 Maximum Daily Amount (code)

01 Average Daily Amount (code)

365 Number of Days On-site (days)

Container Type M Temperature 4 Pressure 1 Storage Locations 779, 881/267, 444, 123/111

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D043	VINYL CHLORIDE	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D040	TRICHLOROETHYLENE	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D035	MEK	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D029	1,1-DICHLOROETHENE	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D028	1,4-DICHLOROETHANE	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
ENDRIN		HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A
D022	CHLOROFORM	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D019	CARBON TET	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D018	BENZENE	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D011	SILVER	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D010	SELENIUM	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D009	MERCURY	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D008	LEAD	LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D007		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D006		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D005		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D004		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D003		LLW,LLM,TRU,TRM,NON,LLT,HAZ,TSC,LAB	664	20	RTR	SA	A
D035	MEK	HAZ,LLT,LLW,LLM,TRU,TRM,NON	664	20	ALL	SA	A

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator	U.S. Department of Energy
Mail Address	P.O. Box 928, Golden, CO 80402-0928
Co-Operator	EG&G Rocky Flats, Inc. Phone 303-966-7000
Mail Address	P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 74-98-6 [X] Pure [ ] Mix

Chemical Name: PROPANE

EHS Name:

[ ] Solid
[X] Liquid
[X] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[X] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[ ] Delayed (chronic)

Inventory

05 Maximum Daily Amount (code)
05 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	2	788, 549, 866, 904 PAD, 439, 442, 713, 771, 774, 792,335,T439A,T442A,331,T760A,T732A,T762A,T372A,750
L	4	2	559/103, 552, 515, 965, 883/144, 777/431A, 980, 707/127, 440,881/224,331,779/222
F	4	2	779/157,559/103

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D019	CARBON TET	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D028	1,4-DICHLOROETHANE	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D035	MEK	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D040	TRICHLOROETHYLENE	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D043	VINYL CHLORIDE	REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
ENDRIN		REM,TRM,RES,TRU,LLM	707	90.106	MODULE_A_GB	SA	A
D001		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D002		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D003		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D005		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D006		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D007		REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D008	LEAD	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D009	MERCURY	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D010	SELENIUM	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D011	SILVER	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D018	BENZENE	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D019	CARBON TET	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D028	1,4-DICHLOROETHANE	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D035	MEK	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D040	TRICHLOROETHYLENE	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A
D043	VINYL CHLORIDE	REM,TRM,RES,TRU,LLM,LLW	707	90.107	MOD_J	SA	A

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS [ ] [ ] Pure [X] Mix

Chemical Name: REGAL OIL R&O 68 #007002

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[X] Immediate (acute)
[ ] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
D	4	1	881, 883, 443, 551, 460/140A, 885, 708, T707S, 707/210, 770, 776, 980
F	4	1	778/105
N	4	1	707/186

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D010	SELENIUM		707	90.105	130B	SA	A
D011	SILVER		707	90.105	130B	SA	A
D018	BENZENE		707	90.105	130B	SA	A
D019	CARBON TET		707	90.105	130B	SA	A
D022	CHLOROFORM		707	90.105	130B	SA	A
D028	1,4-DICHLOROETHANE		707	90.105	130B	SA	A
D029	1,1-DICHLOROETHENE		707	90.105	130B	SA	A
D035	MEK		707	90.105	130B	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D011	SILVER		707	90.146	MOD_C_GB_C-40	SA	A
D018	BENZENE		707	90.146	MOD_C_GB_C-40	SA	A
D019	CARBON TET		707	90.146	MOD_C_GB_C-40	SA	A
D022	CHLOROFORM		707	90.146	MOD_C_GB_C-40	SA	A
D028	1,4-DICHLOROETHANE		707	90.146	MOD_C_GB_C-40	SA	A
D035	MEK		707	90.146	MOD_C_GB_C-40	SA	A
D040	TRICHLOROETHYLENE		707	90.146	MOD_C_GB_C-40	SA	A
D043	VINYL CHLORIDE		707	90.146	MOD_C_GB_C-40	SA	A
ENDRIN			707	90.146	MOD_C_GB_C-40	SA	A
ENDRIN			707	90.146	MOD_C_GB_C-40	SA	A
ENDRIN			707	90.146	MOD_C_GB_C-40	SA	A
ENDRIN			707	90.146	MOD_C_GB_C-40	SA	A
ENDRIN			707	90.146	MOD_C_GB_C-40	SA	A
ENDRIN			707	90.146	MOD_C_GB_C-40	SA	A
D001		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D002		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D003		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A
D005		REM,TRM,TRU,RES,LLM,LLW	707	90.147	MOD_K_GB_K-45	SA	A

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 Dun & Brad Number: 61 605 1538

Owner/Operator Mail Address: U.S. Department of Energy, P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address: EG&G Rocky Flats, Inc. Phone 303-966-7000, P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME: SHIFT SUPERINTENDENT
PHONE: (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: 7631-99-4 [X] Pure [ ] Mix

Chemical Name: SODIUM NITRATE

EHS Name:

[X] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[ ] Immediate (acute)
[X] Delayed (chronic)

Inventory

05 Maximum Daily Amount (code)
05 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	460
C	4	1	460
D	4	1	701/107
F	4	1	701/101
I	4	1	551, 707/107
J	4	1	701, 460, 881
K	4	1	701/101, 881
M	4	1	779, 881, 559/129, 701/101,123,776
N	4	1	881, 701/101, 779/139, 559/129, 123/111, 371, 776/159A2
C	4	1	374/4101

RCRA-REGULATED STORAGE AND TREATMENT UNITS

EPA CODES	CHEM NAME	WASTE TYPE	BUILDING	UNIT	ROOM	UNIT TYPE	STATUS
D011	SILVER	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D018	BENZENE	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D019	CARBON TET	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D028	1,4-DICHLOROETHANE	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D035	MEK	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D040	TRICHLOROETHYLENE	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D043	VINYL CHLORIDE	RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
D001		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.28	E-AND-F-HALL	SA	A
D002		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.28	E-AND-F-HALL	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A
ENDRIN		RES,REM,TRU,LLW,LAB,TRM,LLM	707	90.27	C-AND-D-HALL	SA	A

The following abbreviations are used in this table:

A	Active	RES	Residue
LAB	Awaiting waste type determination	SA	Storage Area
LLM	Low Level Mixed wastes	ST	Storage Tank
LLT	Low Level TSCA (Toxic Substances Control Act) regulated waste	TA	Treatment Area
LLW	Low Level Wastes	TRM	Transuranic Mixed Hazardous Wastes
MEK	2-butanone	TRU	Transuranic Wastes
NON	Non-radioactive, non-hazardous wastes	TSC	Straight TSCA regulated waste
REM	Residue, mixed		

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY
ID #
DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 7664-93-9 [X] Pure [X] Mix

Chemical Name: SULFURIC ACID

EHS Name: SULFURIC ACID

[X] Solid
[X] Liquid
[ ] Gas
[X] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)
04 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	443
E	4	1	703, T900D, GAC-TRLR, 771/249, 373, 371/3159
G	4	1	559/129
J	4	1	374, 881/255,774
M	4	1	371, 779, 783, 444, 881, 559, 771, 776/159A2, T891O, T891N, 774/220, 123/103, 777/415, 991/110, T891R, T771F, T891D, 460,701,891, 995
N	4	1	783, 701/101, 371/3412, 779, 881/264, 460/226, 777/415, 910, 371/2117
R	4	1	995

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 Dun & Brad Number: 61 605 1538

Owner/Operator	U.S. Department of Energy
Mail Address	P.O. Box 928, Golden, CO 80402-0928
Co-Operator	EG&G Rocky Flats, Inc. Phone 303-966-7000
Mail Address	P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS 127-18-4 [X] Pure [ ] Mix

Chemical Name: TETRACHLOROETHYLENE

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[X] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

04 Maximum Daily Amount (code)

04 Average Daily Amount (code)

365 Number of Days On-site (days)

Container Type	Temperature	Pressure	Storage Locations
A	4	1	883
F	4	1	779/113
M	4	1	559/103

APPENDIX 3.9

INDUSTRIAL AREA IM/IRA/DD

OTHER MATERIALS OF CONCERN - RADIONUCLIDES

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code 3489 Dun & Brad Number 61 605 1538

Owner/Operator Mail Address	U.S. Department of Energy P.O. Box 928, Golden, CO 80402-0928
Co-Operator Mail Address	EG&G Rocky Flats, Inc. Phone 303-966-7000 P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY

ID #

DATE RECEIVED

EMERGENCY CONTACT

NAME SHIFT SUPERINTENDENT

PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS [ ] Pure [X] Mix

Chemical Name: UNLEADED FUEL

EHS Name:

[ ] Solid
[X] Liquid
[ ] Gas
[ ] EHS

Physical And Health Hazards

[X] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[ ] Immediate (acute)
[ ] Delayed (chronic)

Inventory

05 Maximum Daily Amount (code)
05 Average Daily Amount (code)
365 Number of Days On-site (days)

Container Type B Temperature 4 Pressure 1 Storage Locations 331

Appendix 3.9
Industrial Area IM/IRA/DD
Other Materials of Concern - Radionuclides

RADIONUCLIDE	BUILDING LOCATION													
Americium	371	374	559	707	771	774	776	777						
Plutonium	371	374	559	707	771	774	776	777	779	886				
Thorium	334	771	881											
Tritium	374	559	561	707	771	774	777	779						
Uranium	331	334	371	374	444	447	559	707	771	776	777	881	883	865	886

Tier Two Emergency and Hazardous Chemical Inventory

Specific Information By Chemical

U.S. Department of Energy Rocky Flats Plant
EG&G Rocky Flats, Inc.
Section 2, Range70W, Township 2S
Golden, Jefferson County, CO 80402

SIC Code: 3489 | Dun & Brad Number: 61 605 1538

Owner/Operator	U.S. Department of Energy
Mail Address	P.O. Box 928, Golden, CO 80402-0928
Co-Operator	EG&G Rocky Flats, Inc. Phone 303-966-7000
Mail Address	P.O. Box 464, Golden, CO 80402-0464

FOR OFFICIAL USE ONLY — ID # — DATE RECEIVED

EMERGENCY CONTACT
NAME SHIFT SUPERINTENDENT
PHONE (303)-966-2914 *24 HOURS*

Reporting Period From January 1 to December 31, 1993

Chemical Description

CAS: [ ] Pure [X] Mix

Chemical Name: HARSHAW CATALYST

EHS Name:

[X] Solid [ ] Liquid [ ] Gas [ ] EHS

Physical And Health Hazards

[ ] Fire
[ ] Sudden Release of Pressure
[ ] Reactivity
[X] Immediate (acute)
[X] Delayed (chronic)

Inventory

04	Maximum Daily Amount (code)
04	Average Daily Amount (code)
365	Number of Days On-site (days)

Container Type: D | Temperature: 4 | Pressure: 1 | Storage Locations: 061

4.0 GROUNDWATER MONITORING

Hydrogeologic conditions at RFP were examined to describe the groundwater flow and identify potential contaminant transport pathways. An understanding of potential contaminant sources and hydrogeologic conditions at RFP provides a technical basis for designing a groundwater monitoring system capable of detecting constituents in groundwater and determining their subsequent migration.

4.1 APPROACH

The COPCs identified in Section 3.0 were assigned to general locations in the Industrial Area. Potential migration pathways from these potential source locations were analyzed to assess the adequacy of the existing monitoring network in the Industrial Area.

The conceptual model for groundwater flow in the upper hydrostratigraphic unit was refined based on an analysis of water-level elevations obtained during high (spring 1992) and low (fall 1992) groundwater periods. The influence of building foundations, permeable sandstone units, and bedrock elevations were incorporated into this analysis. Flow maps were generated to predict the potential migration pathways of contaminants. The flow maps are shown on Plates 4-1 and 4-2, which are located at the end of this document.

The emphasis of this Interim Measure/Interim Remedial Action (IM/IRA) is on monitoring potential releases at the perimeter of the Industrial Area and providing early detection of releases. For this purpose, the locations of groundwater monitoring stations must take into account potential sources, the rate of groundwater flow, and groundwater/surface water interactions. Shallow groundwater and surface water are part of an interactive system at RFP, whereby some of the shallow groundwater flows out of the Industrial Area to seeps or springs where it is evapotranspired from hillslopes or joins surface water. Groundwater and surface water is also diverted along trenches, subsurface culverts, and storm water drains to be conveyed to surface drainages or treatment systems. It is also likely that some groundwater discharges at springs will seep back into the ground and return to the groundwater flow system. It is desirable to monitor groundwater from the upper hydrostratigraphic unit before it leaves the Industrial Area as seeps or springs.

The bedrock claystone that separates the upper and lower hydrostratigraphic units, where present, is generally considered to be a confining layer that inhibits groundwater migration. Pathways may exist within this confining layer as a result of weathering, fractured zones, and building foundations and foundation drains that have been excavated into bedrock.

4.2 CONCEPTUAL GROUNDWATER FLOW MODEL

The direction and velocity of groundwater flow are important factors in the evaluation of the groundwater monitoring network. The properties of each hydrostratigraphic unit are discussed in the following sections.

4.2.1 Flow in the Upper Hydrostratigraphic Unit

The hydrostratigraphic units at RFP were defined in Section 2.2.5.1. At RFP, the upper hydrostratigraphic unit is considered to be the unconfined saturated zones of the unconsolidated and consolidated water-bearing strata. The upper hydrostratigraphic unit consists of several distinct lithostratigraphic units: Rocky Flats Alluvium, colluvium, valley fill alluvium, landslide deposits, weathered Arapahoe and Laramie Formation bedrock, and all sandstone units within the Arapahoe and Laramie Formations that are in hydraulic connection with overlying unconsolidated surficial deposits or the ground surface. The lithostratigraphic units were discussed in detail in Section 2.2.4.

The weathered bedrock zone is commonly less than 15 feet thick, throughout the 6,550 acres at RFP, but may extend to 60 feet below the top of bedrock. Its thickness depends on the abundance of fractures, presence of root zones, elevation relative to the water table, and proximity to valley bottoms (EG&G 1993a).

4.2.1.1 Factors Influencing Groundwater Flow

Groundwater flow in the upper hydrostratigraphic unit is influenced by topography, paleotopography, the permeability of unconsolidated surficial deposits and bedrock, and the distribution of the Arapahoe Formation Number 1 sandstone. Groundwater in the upper hydrostratigraphic unit generally flows away from paleotopographic ridges and along paleotopographic drainages because the subcropping bedrock is mostly claystone and is relatively impermeable. The paleotopographic surface somewhat mimics the present-day topographic surface; however, detailed investigations at OU2 and OU4 revealed that local variations in the top of bedrock surface do not correspond to surface topography in all places. The bedrock configuration profoundly influences groundwater flow.

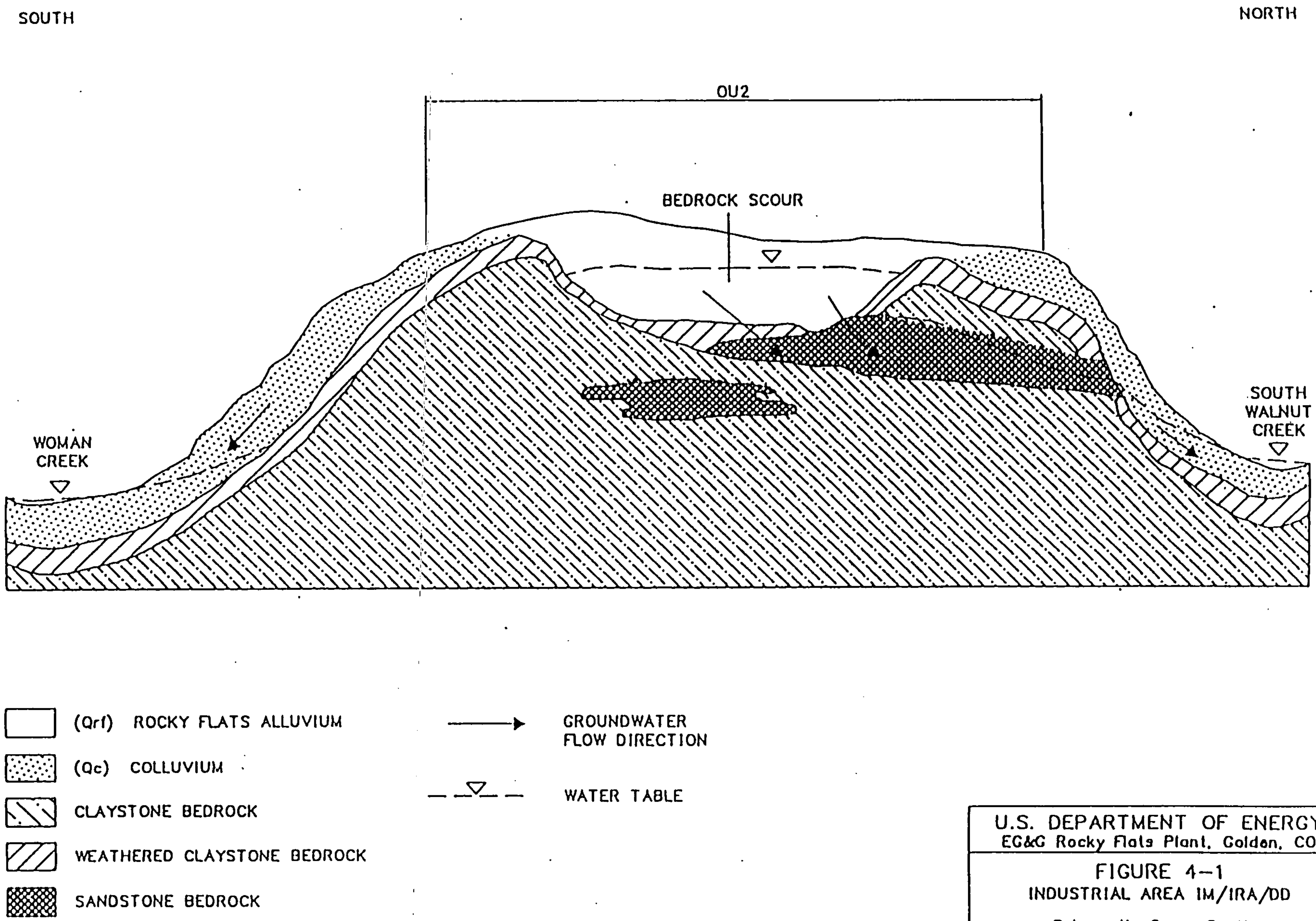
4.2.1.2 Potentiometric Surface Maps

Groundwater potentiometric surface maps of the Industrial Area were constructed for spring and fall 1992 for unconsolidated surficial deposits, and are shown on Plates 4-1 and 4-2, respectively. Water-level measurements (Appendix 4.1) were obtained from 145 monitoring wells in and near the Industrial Area during April 1 to 6, 1992, which is considered a historic high-water period. An additional 78 supplemental wells were measured during the period from April 6 to 30, 1992. Depths to water were measured in 164 monitoring wells in and near the Industrial Area during October 1 to 5, 1992, a low-water period. An additional 75 supplemental wells were measured during the period from October 5 to 29, 1992. To construct the plates using data collected over as short a period as possible, most of the groundwater elevation data were drawn from the primary five- to six-day time periods and supplemental well data were used only if a gap existed in the primary data coverage. Therefore, the potentiometric surface is defined approximately, and groundwater contours are dashed where inferred. The water-table maps were constructed using principally monitoring wells completed in alluvium and colluvium, although the weathered bedrock is considered part of the upper hydrostratigraphic unit. The extent of weathering is difficult to determine from the lithologic descriptions in Appendix 4.1 and geologic borehole logs, so it is unclear which bedrock wells are completed in the upper hydrostratigraphic units. Therefore, data from bedrock wells were generally not used in preparing Plates 4-1 and 4-2.

Groundwater levels reach their highest elevations in the spring and early summer, when precipitation is high and evapotranspiration is low. Groundwater levels decline during the remainder of the year except for periodic fluctuations in response to precipitation events. The spring 1992 water table elevation in the Industrial Area ranged from an approximate high of 6,040 feet above mean sea level (msl) in the west to an approximate low of 5,905 feet msl in the east. Water levels in the saturated alluvium tend to drop slightly in the fall. The October 1992 water-level elevations ranged from approximately 6,035 feet msl in the west to 5,900 feet msl in the east.

The areas of unsaturated alluvium increased in the fall, as indicated by comparing Plates 4-1 and 4-2. The unsaturated areas are located predominantly on the east-west trending ridges of Rocky Flats Alluvium, in the east and east-central portion of the Industrial Area. Limited areas of hillside colluvium were also unsaturated in the fall, southeast and northeast of the Industrial Area. The shape of the unsaturated area in the eastern Industrial Area in fall 1992 is caused by the influence of bedrock topography and mitigative actions such as the french drain in OU1 and the interceptor trench system in OU4. Groundwater collects in depressions and small channels in the bedrock surface that may act as conduits, leaving many higher areas unsaturated, as shown in Figure 4-1.

FINAL



U.S. DEPARTMENT OF ENERGY
EG&G Rocky Flats Plant, Golden, CO

FIGURE 4-1
INDUSTRIAL AREA IM/IRA/DD

Schematic Cross Section of Hydrostratigraphy at OU2 Rocky Flats Plant

The Arapahoe Formation Number 1 sandstone can be a conduit for groundwater flow beneath the unsaturated alluvium and bedrock. The sandstone provides groundwater to the hillside colluvium southeast of the Industrial area. In other areas, weathered bedrock may be a source or sink for groundwater, so the unsaturated zones do not represent no-flow boundaries.

Groundwater flows perpendicular to the water table contours in an isotropic medium. The arrows on Plates 4-1 and 4-2 indicate that flow is generally eastward. However, groundwater flows to the north along the northern perimeter of the Industrial Area and to the south along the southern boundary. A paleodrainage imparts a northeasterly component to flow east of Building 374; groundwater northwest of Buildings 566 and 559 is expected to flow north-northwest. A south-trending paleodrainage exists south of Building 881. A third paleodrainage trends east in the vicinity of Building 991.

Groundwater flow in colluvium is characterized by steep hydraulic gradient values, on the order of 0.13 feet per foot (ft/ft), toward stream drainages and a highly variable saturated thickness controlled by bedrock topography and proximity to recharge sources (e.g., subsurface discharge from the Rocky Flats Alluvium.) Colluvium recharges valley fill alluvium; groundwater is then expected to flow parallel to stream flow and eventually discharge to surface water.

4.2.1.3 Hydraulic Conductivity

The surficial geologic materials are among the more permeable units at RFP. The geometric mean of measured hydraulic conductivity values in the Rocky Flats Alluvium is approximately 10^{-4} centimeters per second (cm/sec) (EG&G 1993b). The geometric means of measured hydraulic conductivities in valley fill alluvium are approximately 10^{-3} cm/sec for Woman Creek alluvium, and 10^{-4} cm/sec for Walnut Creek alluvium (EG&G 1993b). The geometric mean is a useful approximation because of the logarithmic distribution of hydraulic conductivity values. The measured hydraulic conductivity values, which exhibit a wide range because of the diverse nature of the individual geologic units, along with geometric mean values for specific units, are given in Table 4-1.

TABLE 4-1
Industrial Area IM/IRA/DD
Hydraulic Conductivity Values of the Upper Hydrostratigraphic Unit

GEOLOGIC UNIT	HYDRAULIC CONDUCTIVITY (cm/sec)	SOURCE	REMARKS
Rocky Flats Alluvium	1×10^{-4}	(EG&G 1993b)	(geometric mean)
Rocky Flats Alluvium	1×10^{-5}	*RFP Site Environmental Monitoring Report* (EG&G 1991)	(average)
subcropping Arapahoe Fm Sandstone	1×10^{-5}	*RFP Site Environmental Monitoring Report* (EG&G 1991)	(average)
valley fill alluvium, Woman Creek	1×10^{-3}	(EG&G 1993b)	(geometric mean)
valley fill alluvium, Walnut Creek	1×10^{-4}	(EG&G 1993b)	(geometric mean)
Rocky Flats Alluvium, colluvium, Woman Creek valley fill alluvium	9×10^{-7} to 2.9×10^{-2}	OU1 Phase III RFI/RI field investigation	(measured range)
Arapahoe Fm Number 1 sandstone	4.9×10^{-6} to 6.2×10^{-4}	multiple well pump testing in OU2	(measured range)
Rocky Flats Alluvium + subcropping Arapahoe Fm Number 1 sandstone	3.9×10^{-3} to 1.24	OU2 Phase II RFI/RI field investigation	(measured range)
weathered bedrock	10^{-6} to 10^{-5}	*Well Evaluation Report* (EG&G 1993a)	
weathered bedrock	5×10^{-7} to 3×10^{-5} or less	OU1 slug tests	(measured)

Notes:
cm/sec = centimeters per second
Fm = Formation
OU = operable unit
RFP = Rocky Flats Plant

4.2.2 Flow in the Lower Hydrostratigraphic Unit

The lower hydrostratigraphic unit is composed of unweathered bedrock of the Arapahoe and Laramie Formations. Groundwater flow in the lower hydrostratigraphic unit is to the east, generally in the same direction as the dip of the bedrock strata.

The lower hydrostratigraphic unit hydraulic conductivities are generally lower than those of the overlying upper hydrostratigraphic unit. Reported hydraulic conductivity values are given in Table 4-2.

TABLE 4-2
Industrial Area IM/IRA/DD
Hydraulic Conductivity Values of the Lower Hydrostratigraphic Unit

GEOLOGIC UNIT	HYDRAULIC CONDUCTIVITY (cm/sec)	SOURCE	REMARKS
unweathered bedrock sandstone	1×10^{-6}	*RFP Site Environmental Report* (EG&G 1993c)	(average)
weathered and unweathered claystone	1×10^{-8} to 10^{-7}	*RFP Site Environmental Report* (EG&G 1993c)	
unweathered claystone bedrock	1×10^{-8} to 10^{-6}	*Well Evaluation Report* (EG&G 1993a)	
unweathered bedrock	2.4×10^{-8} to 4.5×10^{-6}	*Groundwater Protection and Monitoring Program Plan* (EG&G 1993d)	packer tests

The hydraulic conductivities of unweathered bedrock generally range from 1×10^{-8} to 1×10^{-6} cm/sec (3×10^{-5} to 3×10^{-3} feet per day [ft/day]). The Laramie Formation sandstones are expected to have hydraulic conductivities between those of the Number 1 sandstone and the unweathered siltstones and claystones. The Laramie Formation sandstones are approximately 15 feet thick or less, except where these sandstone channel deposits are stacked or coalesced. Generally, these sandstones are laterally discontinuous.

4.2.3 Flow in the Laramie-Fox Hills Aquifer

Below RFP, groundwater in the Laramie-Fox Hills aquifer flows from the outcrop recharge area west of RFP to deeper parts of the aquifer to the east (Robson et al. 1981). The hydraulic gradient is approximately 0.025 ft/ft to the east. The average hydraulic conductivity measured northeast of RFP ranges from 0.01 to 0.04 ft/day (3.5×10^{-6} to 1.4×10^{-5} cm/sec) (Robson 1983).

4.2.4 Vertical Groundwater Flow

Groundwater at RFP has both horizontal and vertical components of flow. The direction of vertical flow (downward or upward) and degree of hydraulic connection between lithostratigraphic or hydrostratigraphic units is important in evaluating potential pathways.

4.2.4.1 <u>Vertical Hydraulic Gradients</u>

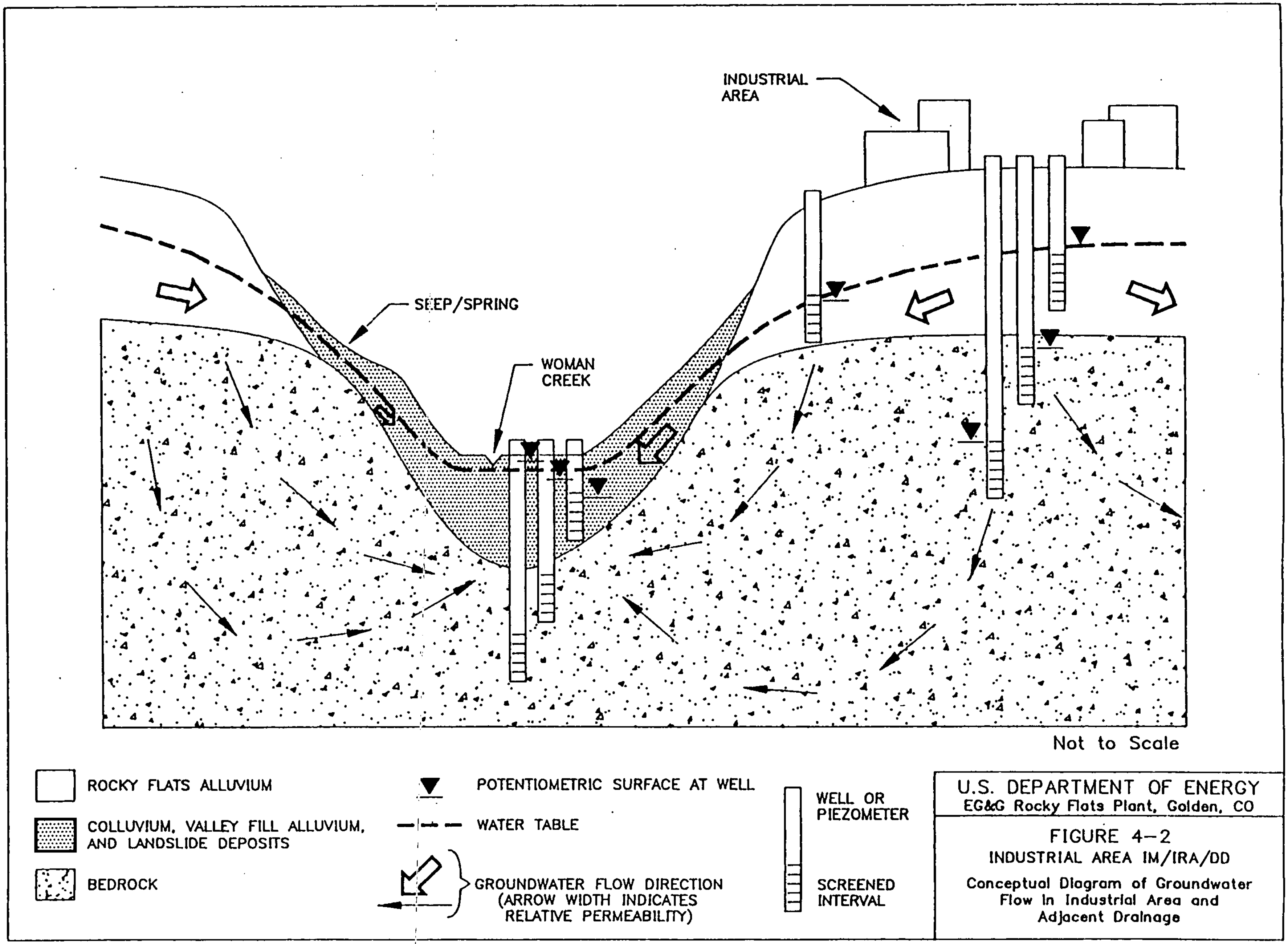
Downward vertical gradients have been documented in the Industrial Area topographic highs (EG&G 1993a). The 1993 *Well Evaluation Report* examined cross sections and well cluster hydrographs to assess the hydraulic connection and hydraulic gradients between alluvial and bedrock wells. The spring 1992 water levels in wells in the unconsolidated surficial deposits were higher than those in the bedrock wells, indicating a downward vertical gradient in the central Industrial Area.

Upward hydraulic gradients were identified in well clusters located in the topographically low areas near the bottoms of drainages (EG&G 1993a). Data were limited but suggest that groundwater in the bedrock may recharge unconsolidated surficial deposits in stream drainages, as schematically shown in Figure 4-2. Because vertical hydraulic connection between bedrock and alluvium is relatively poor, flow volume is likely to be limited (EG&G 1993a). Most well cluster hydrographs showed poor hydraulic connection between the bedrock and unconsolidated surficial deposits. The study concluded that the deeper hydrostratigraphic units at RFP (typically greater than 100 feet deep) are generally not in direct hydraulic connection with the upper hydrostratigraphic unit (EG&G 1993a). This lack of direct hydraulic connection indicates that groundwater from the upper hydrostratigraphic unit will not quickly nor easily migrate downward to the lower hydrostratigraphic unit, despite downward vertical gradients.

Vertical hydraulic gradient values on the order of 0.79 to 1.05 ft/ft have been estimated between the colluvium and bedrock sandstones at OU1 (EG&G 1993d). The amount of flow through claystone is assumed to be small, based on the fine-grained lithology and limited occurrence of fractures at depth observed in cores. Fracturing, where evident, is most abundant in the weathered bedrock zone. Cores from borings in the 1991/1992 site-wide drilling program indicate that fractures (1) occurred individually and in discrete zones, (2) were often oblique to near vertical, (3) exhibited iron-staining in the upper portion of the bedrock, and (4) appeared to decrease with depth.

Regional water-level elevations indicate that a strong downward vertical gradient also exists between the upper hydrostratigraphic unit and the Laramie-Fox Hills aquifer. In the RFP area, the potentiometric surface in the Laramie-Fox Hills aquifer is 50 to 100 feet lower than the water level in the overlying alluvium (Robson et al. 1981). However, the thick Laramie Formation claystone and siltstone prevent direct connection between surficial groundwater and the Laramie-Fox Hills aquifer.

Apparent vertical hydraulic gradients based on differences in water levels within adjacent wells can be a result, in part, of differences in hydraulic conductivity of the strata encountered and/or confining layers penetrated by the deeper screened well. If there is



c:\rflats\sw\swfig42.dwg 05H60300

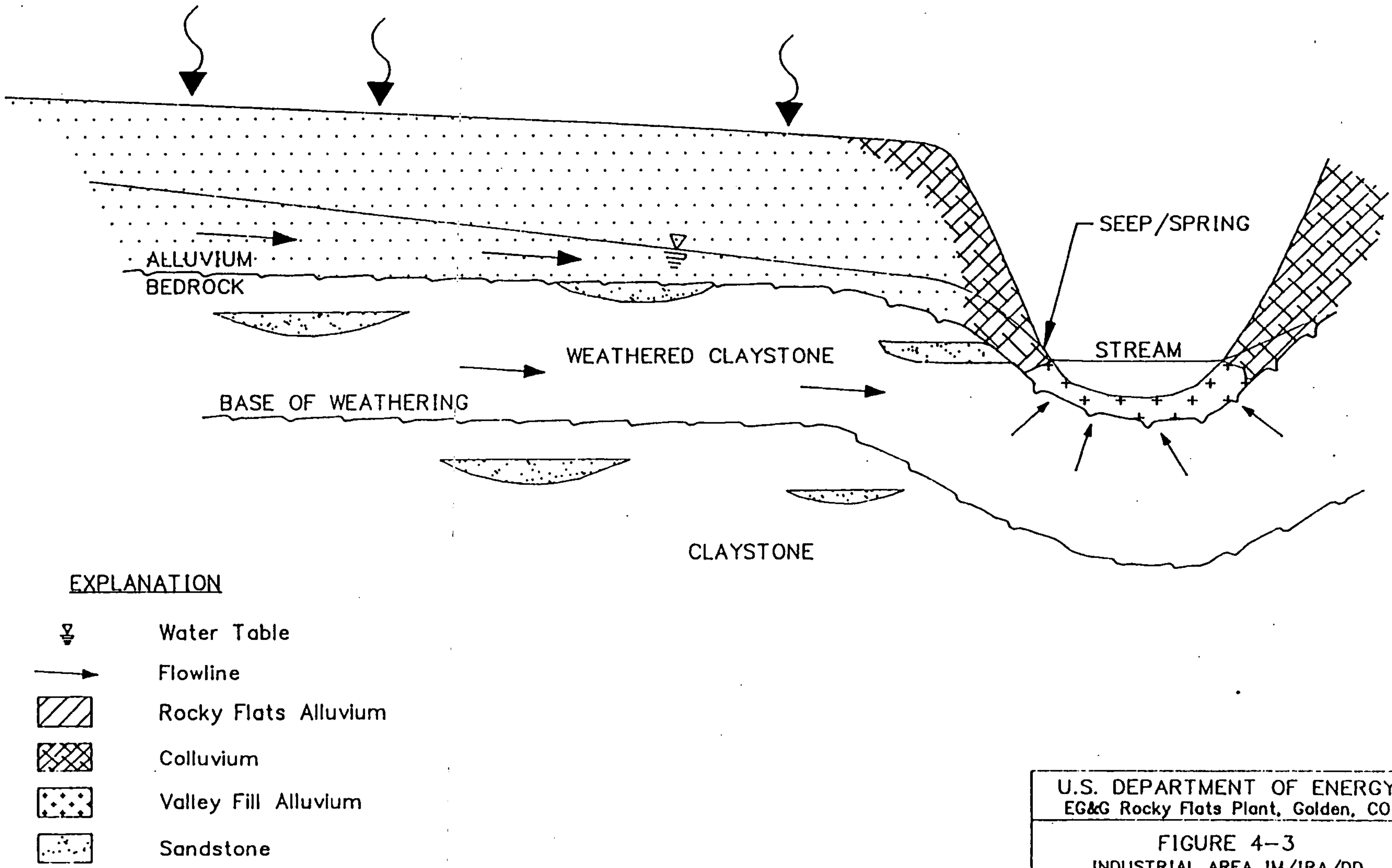
limited hydraulic communication between the strata in which the wells are completed, the flow of water between the strata may be insignificant despite apparent vertical hydraulic gradients.

4.2.4.2 Vertical Hydraulic Conductivities

Vertical hydraulic conductivity values may be three to 10 times less than horizontal hydraulic conductivity values in clays and shales (Freeze and Cherry 1979). Therefore, the vertical hydraulic conductivity of the lower hydrostratigraphic unit bedrock strata could be on the order of 1×10^{-9} to 1×10^{-7} cm/sec (3×10^{-6} to 3×10^{-4} ft/day). Although fracturing and more permeable zones could contribute to higher vertical conductivities than estimated, the low vertical hydraulic conductivities and the adsorptive properties of clay materials are expected to retard the downward movement of chemical constituents.

4.2.5 Groundwater/Surface Water Interaction

The interrelationship of surface water and groundwater is an important consideration for environmental monitoring at RFP. Groundwater from the upper hydrostratigraphic unit discharges at springs and seeps on the hillsides of the Industrial Area at the contact between the alluvium and bedrock and where shallow sandstones crop out in the drainages. Seeps and associated wetlands are indicated on Plates 4-1 and 4-2, based on U.S. Geological Survey (USGS) 1:24,000 scale mapping, circa 1980. Water at seeps is either consumed by evapotranspiration or flows downslope as surface flow or through colluvial deposits to south Walnut Creek or Woman Creek. A conceptual cross section, showing surface water infiltration on topographic highs and discharge at seeps and springs, is shown in Figure 4-3.



Not To Scale

U.S. DEPARTMENT OF ENERGY
EG&G Rocky Flats Plant, Golden, CO

FIGURE 4-3
INDUSTRIAL AREA IM/IRA/DD
Schematic of
Groundwater/Surface Water
Interaction

c:\rflats\sw\SWF1043.dwg 05H80300

4.3 EXISTING MONITORING PROGRAMS

Groundwater monitoring is one component of the larger RFP groundwater program. The objectives of the overall groundwater program are as follows:

- Prevent further degradation of the upper hydrostratigraphic unit.
- Ensure compliance with regulations.
- Clean up existing contamination.
- Monitor existing conditions.

The groundwater monitoring program at RFP is largely defined by regulatory requirements. Groundwater monitoring is performed under several different programs, which are conceptually linked under the Groundwater Protection and Monitoring Program (GPMP). The GPMP implements a groundwater monitoring plan designed to satisfy a wide array of regulatory requirements, including DOE Order 5400.1, RCRA, and CERCLA. Additional requirements are specified by the IAG, the AIP, and other applicable regulations.

4.3.1 Purposes for Groundwater Monitoring

The purposes of the RFP groundwater monitoring program are to determine background analyte values, measure the concentrations of hazardous and nonhazardous constituents, and assess the rate of movement and extent of any contaminant plumes. Wells in the monitoring program are divided into six subprograms on the basis of purpose and regulatory requirements. These subprograms, along with their monitoring objectives, are as follows:

- Background Monitoring. To detect levels of chemical constituents in groundwater at locations not affected by RFP activities. Background monitoring was terminated in September 1993.

- RCRA Regulatory Monitoring. To monitor the upper hydrostratigraphic unit within and immediately adjacent to a RCRA OU.

- RCRA Characterization Monitoring. To characterize and/or monitor hydrostratigraphic units other than the upper hydrostratigraphic unit at or near RCRA units.

- CERCLA Monitoring. To characterize groundwater and the extent and movement of constituents as part of remedial investigation/feasibility study (RI/FS) activities in compliance with CERCLA remediation requirements.

- Boundary Monitoring. To monitor groundwater movement and quality at the RFP boundaries, downgradient of RFP affected areas.

- Special Purpose Monitoring. Includes other wells installed at the RFP that are used to characterize groundwater and hydrogeology for a variety of purposes.

4.3.2 Wells Monitored and Sampling Frequency

As of November 1993, there were 371 active wells and 84 piezometers in the RFP groundwater monitoring network (EG&G 1993d). An additional 196 wells were inactive or had been abandoned since the first monitoring wells were installed in the 1950s. One hundred fifty-five active wells and piezometers are located in the Industrial Area.

Water-level measurements are obtained each quarter for every one of the 455 active wells and piezometers, and monthly in approximately 95 wells and piezometers. Groundwater

FINAL

TABLE 4-3
Industrial Area IM/IRA/DD
Status of Monitoring Wells in the Industrial Area at Rocky Flats Plant
October 14, 1993

1	0260	751181	2085023	PA	ABANDONED					5934.6	5935.01	22.6			
2	0360	750889	2085491	PA	ABANDONED					5957.2		20.2			
3	0460	750574	2085531	PA	ABANDONED					5962.0	5972.72	17.7			
4	0560	750308	2085404	PA	ABANDONED					5966.4		19.4			
5	0660	750124	2084921	PA	ABANDONED					5972.6		28.8			
6	0266	751062	2085681	PA	ABANDONED					5949.4		139.7			
7	0168	749242	2085581	PA	ABANDONED					5977.2		4.0			
8	0268	748887	2085579	PA	ABANDONED					5979.6		4.0			
9	0368	748887	2085957	PA	ABANDONED					5974.5		4.0			
10	0468	749241	2085957	PA	ABANDONED					5973.3		4.0			
11	0271	748513	2085950		ABANDONED					5936.2	5936.79	28.6			
12	0174	749626	2086195		ABANDONED					5968.0	5968.80	24.2			
13	0974	748028	2084783		ABANDONED					5925.1	5926.25	19.0			
14	1074	747988	2084705		ABANDONED					5925.8	5925.91	9.9			
15	2174	748990	2082636		ABANDONED					6026.6		258.0			
16	0681	750859	2082503	PA	ABANDONED					6004.4	6005.70	30.6			
17	0781	750860	2082539	PA	ABANDONED					6004.1	6006.06	29.4			
18	1986	750894	2083296	Solar Pond	ACTIVE	Special Purpose	N	Kclst	L?	5943.1	5943.86	12.3	3.0	12.3	11.5
19	2086	751112	2084358	Solar Pond	ABANDONED			fill	U	5960.5	5962.12	10.6	4.2	10.6	12.5
20	2186	750855	2082501	Plant North	ACTIVE	Special Purpose	N	Kss & Ksltclst	U?	6004.8	6005.96	67.3	35.0	67.2	15.0
21	2286	750718	2084411	Solar Pond	ACTIVE	RCRA	Q	Qrf	U	5978.8	5979.55	11.2	3.2	11.2	11.0
22	2386	750338	2084259	Solar Pond	ACTIVE	RCRA-C	Q	Kslt & Ksltclst	L?	5982.5	5982.46	117.3	113.0	117.3	8.2
23	2486	750338	2084277	Solar Pond	ACTIVE	RCRA	Q	Qrf	U	5982.5	5983.56	7.5	3.0	7.5	7.2
24	2586	750412	2084831	Solar Pond	ACTIVE	RCRA-C	Q	Ksltclst & Kclst	L?	5975.2	5977.14	82.0	59.9	82.0	8.0
25	2686	750411	2084841	Solar Pond	ACTIVE	RCRA	Q	Qrf	U	5975.4	5977.17	11.0	3.8	11.0	10.5
26	2786	750781	2085238	Solar Pond	ACTIVE	RCRA-C	Q	Ksslts & Ksclst	U?	5962.9	5963.88	133.0	128.5	133.0	11.0
27	2886	750803	2085240	Solar Pond	ABANDONED			Qrf	U	5962.4	5964.38	8.6	4.0	8.6	8.5
28	2986	750599	2085687	Solar Pond	ACTIVE	RCRA	Q	Qrf	U	5959.6	5960.68	8.8	2.8	8.8	8.5
29	3086	751078	2084921	Solar Pond	ACTIVE	RCRA	Q	Kclst	L?	5957.4	5958.39	14.9	2.5	14.9	2.5
30	3186	751051	2084764	Solar Pond	ACTIVE	RCRA	N	Kss & Kslt	U?	5965.0	5967.05	17.3	2.5	17.3	0.5
31	3286	751050	2084743	Solar Pond	ACTIVE	RCRA-C	Q	Kss & Ksltss	L?	5966.1	5967.92	125.5	114.9	125.5	1.0
32	3386	749950	2085003	Mound Area	ACTIVE	RCRA	Q	Qrf	U	5951.4	5952.42	7.3	3.0	7.3	6.8
33	3486	750162	2086193	East Trenches	ACTIVE	CERCLA	Q	Kcss & Kcslt	L?	5912.0	5913.95	56.3	44.2	56.3	16.0
34	3586	750167	2086219	East Trenches	ACTIVE	CERCLA	Q	Qc	U	5910.8	5912.76	11.6	4.9	11.6	10.5
35	4386	749404	2085869	Mound Area	ACTIVE	CERCLA	Q	Qrf	U	5972.9	5974.46	16.8	4.0	16.8	17.0
36	4486	749254	2082234	Plant West	ACTIVE	Special Purpose	N	Qrf	U	6019.9	6021.96	26.3	3.2	26.3	25.5
37	6186	749198	2083717	881 Hillside	ACTIVE	Special Purpose	N	Qrf	U	5999.5	6000.60	12.3	5.0	12.0	11.5

FINAL

TABLE 4-3
Industrial Area IM/IRA/DD
Status of Monitoring Wells in the Industrial Area at Rocky Flats Plant
October 14, 1993

38	0187	748127	2083653	881 Hillside	ACTIVE	CERCLA	Q	fill	U	5992.5	5994.08	12.1	3.4	11.8	11.8
39	0587	748081	2084849	881 Hillside	ACTIVE	CERCLA	Q	Kss & Ksltss	U?	5927.9	5929.99	51.5	42.0	51.3	11.0
40	0987	749068	2085348	903 Pad	ACTIVE	CERCLA	Q	Kss	U?	5980.2	5981.70	32.4	14.5	32.2	12.5
41	1087	748946	2085290	903 Pad	ACTIVE	CERCLA	Q	Qrf	U	5982.0	5983.52	12.0	3.5	12.0	11.3
42	1287	748581	2086066	903 Pad	ACTIVE	CERCLA	Q	Kcslt	L?	5934.8	5936.30	10.2	4.9	10.0	3.5
43	1587	749011	2086249	903 Pad	ACTIVE	CERCLA	Q	Qrf	U	5971.3	5972.79	22.5	5.8	22.1	21.9
44	1687	749130	2086249	903 Pad	ACTIVE	CERCLA	Q	Kslt	L?	5969.5	5970.79	125.2	100.0	125.0	22.2
45	1787	749415	2086308		ABANDONED			Qrf	U	5968.0	5969.56	25.8	3.5	25.5	25.0
46	1887	749404	2086339	Mound Area	ACTIVE	CERCLA	Q	Kss & Ksslt	U?	5968.0	5969.49	133.7	127.0	133.5	25.2
47	1987	749623	2086171	Mound Area	ACTIVE	CERCLA	Q	Qrf	U	5968.4	5969.91	11.9	3.5	11.7	10.8
48	2087	749634	2086155	Mound Area	ACTIVE	CERCLA	N	Ksltclst	L?	5968.7	5970.14	116.4	107.3	116.1	11.8
49	2187	749969	2085799	Mound Area	ACTIVE	CERCLA	Q	Qc	U	5928.4	5929.69	10.6	3.3	10.4	8.0
50	2287	749924	2085822	Mound Area	ACTIVE	CERCLA	Q	Kss & Kslt	U?	5931.2	5932.80	88.7	81.4	88.5	12.8
51	2387	749404	2085910	Mound Area	ACTIVE	CERCLA	N	Ksltss & Kclst	U?	5972.8	5974.49	37.9	17.2	37.6	15.2
52	3787	750494	2085224		ABANDONED			Qrf	U	5967.5	5968.99	9.0	3.5	8.8	8.0
53	3887	750396	2085094	Solar Pond	ACTIVE	RCRA	Q	Qrf	U	5972.2	5973.90	9.5	3.5	9.3	7.8
54	3987	751081	2085268		ACTIVE	RCRA-C	Q	Ksslt & Kclst	U?	5947.0	5948.42	117.4	110.0	117.1	3.5
55	4387	748030	2084788	881 Hillside	ACTIVE	CERCLA	N	Qc	U	5925.1	5926.41	12.5	3.5	12.3	12.0
56	4487	748306	2085435	903 Pad	ACTIVE	CERCLA	N	Qc	U	5949.6	5951.10	3.7	1.5	3.5	3.2
57	4587	748313	2085451	903 Pad	ACTIVE	CERCLA	Q	Kss & Kslt & Kclst	U?	5949.3	5950.91	101.3	89.5	97.1	4.0
58	5187	748103	2083850	881 Hillside	ACTIVE	CERCLA	Q	fill?	U	5963.3	5965.22	14.0	3.6	13.8	12.5
59	5287	748145	2084067	881 Hillside	ACTIVE	CERCLA	Q	fill?	U	5967.9	5969.57	20.5	3.5	20.3	20.0
60	5687	750638	2084423	Solar Pond	ACTIVE	RCRA	Q	Qrf	U	5978.4	5979.77	9.9	3.5	9.7	9.4
61	B208089	751143	2085876	Solar Pond	ACTIVE	RCRA	Q	Qc	U	5935.4	5937.07	14.2	3.4	12.9	12.2
62	B208189	751138	2085885	Solar Pond	ACTIVE	RCRA	Q	Kclst	L?	5935.4	5937.46	27.6	16.9	26.3	11.0
63	P114389	750990	2081739	Plant	ACTIVE	Special Purpose	N	Qrf	U	5991.2	5993.17	15.8	10.1	14.5	14.0
64	P114489	750337	2081246	Plant	ACTIVE	Special Purpose	N	Qrf	U	6033.4	6035.43	50.1	44.4	48.8	48.3
65	P114589	750396	2081731	Plant	ACTIVE	Special Purpose	N	Qrf	U	6024.1	6025.90	37.6	32.5	36.5	27.5
66	P114689	749943	2083044		ACTIVE	Special Purpose		Qrf	U	6004.0	6005.76	23.5	17.8	22.2	22.0
67	P114789	749940	2082610	Plant	ACTIVE	Special Purpose	N	Qrf	U	6010.7	6012.40	27.6	21.8	26.2	26.0
68	P114889	749926	2082127	Plant	ACTIVE	Special Purpose	N	Qrf	U	6016.6	6018.26	15.6	9.9	14.3	13.8
69	P114989	749959	2081661	Plant	ACTIVE	Special Purpose	N	Qrf	U	6029.8	6031.84	39.3	33.6	38.0	37.5
70	P115089	749930	2081258	Plant	ACTIVE	Special Purpose	N	Qrf	U	6038.1	6040.10	42.0	36.3	40.7	40.2
71	P115489	749507	2082135	Plant	ACTIVE	Special Purpose	N	Qrf	U	6023.4	6025.10	27.8	22.1	26.5	26.0
72	P115589	749551	2082658	Plant	ACTIVE	Special Purpose	N	Qrf	U	6014.1	6015.77	30.7	25.1	29.5	29.0
73	P115689	749532	2083019	Plant	ACTIVE	Special Purpose	N	Qrf	U	6006.9	6008.71	21.3	16.2	20.2	19.7
74	P119389	750280	2081921	Plant	ACTIVE	Special Purpose	N	Qrf	U	6011.7	6013.18	18.2	12.5	16.9	16.4

TABLE 4-3
Industrial Area IM/IRA/DD
Status of Monitoring Wells in the Industrial Area at Rocky Flats Plant
October 14, 1993

75	P207389	750195	2084468	Solar Pond	ACTIVE	RCRA	Q	Kss & Kclst	U?	5981.0	5982.77	16.2	10.5	15.2	7.0
76	P207489	750197	2084481	Plant	ABANDONED			Qrf	U	5980.7	5982.64	8.2	2.4	7.0	6.5
77	P207589	750395	2084843	Solar Pond	ACTIVE	RCRA	N	Ksltclst	L?	5974.1	5975.96	25.1	14.4	23.9	9.4
78	P207689	750398	2085318	Solar Pond	ACTIVE	RCRA	Q	Qrf	U	5966.3	5967.88	14.4	3.6	13.1	12.6
79	P207789	750392	2085343	Solar Pond	ACTIVE	RCRA	Q	Ksltclst	L?	5965.9	5967.75	28.6	17.9	27.3	12.9
80	P207889	750671	2085343	Solar Pond	ACTIVE	RCRA	Q	Qrf	U	5962.8	5964.90	9.0	3.3	7.7	8.5
81	P207989	750671	2085330	Solar Pond	ACTIVE	RCRA	Q	Kclst	L?	5963.1	5965.17	21.7	11.0	20.5	5.8
82	P208889	751086	2085249	Solar Pond	ACTIVE	RCRA-C	Q	Ksltclst	L?	5947.3	5949.25	99.2	87.8	96.9	5.5
83	P208989	751044	2084839	Solar Pond	ACTIVE	RCRA	Q	Ksltss & Ksltclst	U?	5962.5	5964.56	26.1	15.4	24.8	3.5
84	P209089	750566	2084910	Solar Pond	ACTIVE	RCRA	Q	Ksltclst	L?	5972.2	5974.25	27.2	16.5	26.0	11.5
85	P209189	750762	2084309	Solar Pond	ACTIVE	RCRA	N	Kss & Ksltclst	U?	5980.7	5982.21	36.1	13.3	35.0	10.3
86	P209289	750863	2084139	Solar Pond	ACTIVE	RCRA	Q	Qrf	U	5981.6	5983.42	13.4	8.2	12.7	12.2
87	P209389	750864	2084130	Solar Pond	ACTIVE	RCRA	Q	Kss & Ksltss & Kcss	U?	5981.5	5983.39	30.1	16.8	28.8	13.8
88	P209489	750991	2084634	Solar Pond	ACTIVE	RCRA	Q	Kss & Ksltss	U?	5978.0	5980.10	36.3	15.5	35.0	9.0
89	P209589	751071	2085286	Solar Pond	ACTIVE	RCRA	Q	Ksltclst & Ksclst	L?	5948.2	5950.04	19.8	9.1	18.5	4.1
90	P209689	750533	2085514	Solar Pond	ACTIVE	RCRA	Q	Ksltclst	L?	5962.6	5964.43	27.9	17.2	26.7	12.2
91	P209789	750579	2085481	Solar Pond	ACTIVE	RCRA	Q	Qrf	U	5962.8	5964.94	13.8	3.0	12.5	12.0
92	P209889	751194	2084984	Solar Pond	ACTIVE	RCRA	Q	Ksltclst	L?	5940.3	5942.40	19.6	8.9	18.3	3.9
93	P209989	751565	2084649	Solar Pond	ACTIVE	RCRA	N	Qc	U	5898.1	5900.40	9.6	3.8	8.2	7.7
94	P210089	751564	2084639	Solar Pond	ACTIVE	RCRA	Q	Ksltclst	L?	5898.4	5900.40	22.9	12.2	21.5	7.2
95	P210289	750564	2085223	Solar Pond	ABANDONED			Ksltclst	L?	5967.0	5969.19	22.3	11.6	21.0	6.6
96	P213689	749460	2083736	Plant	ACTIVE	Special Purpose	N	Qrf	U	5994.3	5996.04	14.8	9.1	13.5	13.0
97	P213889	750466	2086109	Plant	ACTIVE	RCRA	N	Kss & Kcss	U?	5954.1	5955.94	22.0	11.3	20.8	8.0
98	P213989	750468	2086102	Plant	ACTIVE	RCRA	N	Qrf	U	5954.3	5956.38	7.2	3.3	6.9	6.7
99	P215789	749470	2083430	Plant	ACTIVE	Special Purpose	N	Qrf	U	6002.0	6003.66	19.6	14.5	18.5	18.0
100	P218089	749941	2084020	OPWL	ACTIVE	Special Purpose	Q	Qrf	U	5985.8	5987.55	8.7	3.0	7.4	6.0
101	P218389	750831	2085648	Plant	ACTIVE	RCRA	N	Qrf	U	5956.2	5958.45	13.8	8.1	12.5	12.0
102	P219089	751127	2084117	Plant	INACTIVE	Special Purpose	N	Qc, Kclst & Ksltclst	U	5949.1	5949.90	15.7	5.0	14.4	10.4
103	P219189	751222	2084010	Plant	ACTIVE	Special Purpose	N	Qc	U	5941.2	5943.15	12.8	7.1	11.5	11.0
104	P219489	750415	2085651	Plant	ACTIVE	RCRA	N	Qrf	U	5959.5	5961.15	24.2	18.5	22.9	22.5
105	P219589	750268	2085536	Plant	ACTIVE	RCRA	N	Kclst & Ksclst	L?	5963.8	5965.70	27.0	21.3	25.7	17.2
106	P313489	748913	2083062	Plant	ACTIVE	Special Purpose	N	Qrf	U	6011.7	6013.58	22.4	16.7	21.1	20.6
107	P313589	748510	2083547	Plant	ACTIVE	Special Purpose	N	Qrf	U	6008.5	6010.11	13.8	8.1	12.5	11.0
108	P314089	749461	2083653		ACTIVE	Special Purpose		Qrf	U	5996.7	5998.49	11.1	5.4	9.8	9.3
109	P314289	748216	2083280	Plant	ACTIVE	Special Purpose	N	Qrf	U	6010.1	6011.77	14.8	9.1	13.5	13.0
110	P317989	748891	2084272	OPWL	ACTIVE	Special Purpose	N	Qrf	U	5990.9	5992.84	8.7	3.0	7.5	6.4
111	P320089	748799	2083280		ACTIVE	Special Purpose		Qrf	U	6009.9	6011.87	20.1	14.4	18.8	18.8

FINAL

TABLE 4-3
Industrial Area IM/IRA/DD
Status of Monitoring Wells in the Industrial Area at Rocky Flats Plant
October 14, 1993

112	P414189	749059	2082986	Plant	ACTIVE	Special Purpose	N	Qrf	U	6010.6	6012.18	19.8	14.1	18.5	18.0
113	P415889	749125	2080718	Plant	ACTIVE	Special Purpose	N	Qrf	U	6050.4	6052.60	44.5	38.8	43.2	49.5
114	P415989	749025	2081011	Plant	ACTIVE	Special Purpose	N	Qrf	U	6044.9	6046.71	28.0	22.3	26.7	34.0
115	P416089	748605	2080720	Plant	ACTIVE	Special Purpose	N	Qrf	U	6051.7	6053.95	35.4	29.2	34.0	33.5
116	P416189	748606	2081120	Plant	ACTIVE	Special Purpose	N	Qrf	U	6045.6	6047.95	30.9	25.2	29.7	29.2
117	P416289	748598	2081555	Plant	ACTIVE	Special Purpose	N	Qrf	U	6038.6	6040.22	24.8	19.1	23.5	23.0
118	P416389	748313	2080631	Plant	ACTIVE	Special Purpose	N	Qrf	U	6055.4	6057.14	31.4	25.7	30.1	30.0
119	P416489	748210	2081113	Plant	ACTIVE	Special Purpose	N	Qrf	U	6048.5	6050.15	27.0	21.3	25.7	25.2
120	P416589	748211	2081546	Plant	ACTIVE	Special Purpose	N	Qrf	U	6041.2	6042.81	32.1	27.0	31.0	30.5
121	P416689	748147	2081941	Plant	ACTIVE	Special Purpose	N	Qrf	U	6035.0	6036.55	33.8	28.1	32.5	32.0
122	P416789	748206	2082382	Plant	ACTIVE	Special Purpose	N	Qrf	U	6027.8	6029.27	28.2	22.5	26.9	26.4
123	P416889	748206	2082815	Plant	ACTIVE	Special Purpose	N	Qrf	U	6017.4	6018.79	21.5	15.9	20.3	20.2
124	P416989	748780	2081034	Buffer West	INACTIVE	Special Purpose	N	Ksslt & Kslt	L?	6045.2	6047.55	158.0	151.2	155.6	30.0
125	P418289	748952	2082653		ACTIVE			Qrf	U	6016.9	6018.20	26.7	9.6	23.5	23.0
126	P419689	748522	2082513	Plant	ACTIVE	Special Purpose	N	Qrf & Kss	U	6022.4	6023.42	24.8	19.1	23.5	22.0
127	00191	749237	2086244		ACTIVE	CERCLA	Q	Qrf	U	5968.9	5970.44	27.0	15.0	25.0	24.2
128	01391	749402	2085226		ACTIVE	CERCLA	Q	Qrf	U	5973.7	5975.30	16.0	6.0	14.0	14.5
129	01491	749430	2085474		ACTIVE	CERCLA	Q	Kss & Kcs	U?	5970.4	5972.03	26.0	14.0	24.0	1.6
130	01791	749504	2086018		ACTIVE	CERCLA	Q	Ksltss & Ksclst	U?	5965.8	5967.41	20.0	10.0	18.0	8.0
131	01891	749438	2086023	903, Trench	ACTIVE	CERCLA	Q	Kslts & Kslts & Ksltclst	U?	5971.8	5973.37	32.0	20.0	30.0	12.4
132	02091	749617	2086428		ACTIVE	CERCLA	Q	Ksclst, Ksslt, Ksltclst	U?	5965.2	5966.65	32.6	15.6	30.6	16.1
133	02191	749708	2086166		ACTIVE	CERCLA	Q	Qrf	U	5965.8	5967.51	15.0	8.0	13.0	13.5
134	02291	749880	2086139		ACTIVE	CERCLA	Q	Ksclst & Kcss	U?	5936.7	5938.26	18.5	11.5	16.5	8.8
135	02491	749949	2086432		ACTIVE	CERCLA		Kslts, Ksslt	U?	5944.5	5946.21	18.8	11.8	16.8	8.5
136	02691	750385	2086043		ACTIVE	CERCLA	Q	Kslts & Ksltclst	U?	5934.8	5936.38	18.0	6.0	16.0	1.1
137	06591	749064	2085535	903 Pad, LIP	ACTIVE	CERCLA	Q	Ksclst & Ksltclst	L?	5978.3	5979.78	50.0	33.0	48.0	15.4
138	06691	749068	2085714	903 Pad	ACTIVE	CERCLA	Q	Qrf	U	5978.3	5979.94	25.1	13.1	23.1	22.0
139	06791	748855	2085646		ACTIVE	CERCLA	Q	Qrf	U	5978.9	5980.38	23.2	11.2	21.2	21.2
140	06891	749258	2085883	903 Pad	ACTIVE	CERCLA	Q	Qrf	U	5974.1	5975.62	16.0	6.0	14.0	14.0
141	06991	749168	2085990	903 Pad	ACTIVE	CERCLA	Q	Qrf	U	5972.9	5974.57	31.0	14.0	29.0	28.6
142	07191	748850	2085908	903 Pad, LIP	ACTIVE	CERCLA	Q	Qrf	U	5974.8	5976.34	23.1	11.1	21.1	20.0
143	07291	748748	2085766	903 Pad	ACTIVE	CERCLA	Q	Qrf	U	5977.3	5978.80	22.6	10.6	20.6	20.0
144	07391	748547	2085827	903 Pad	ACTIVE	CERCLA	Q	Qrf & Kclst	U	5949.1	5950.61	13.4	5.4	11.4	8.1
145	08891	749128	2085866		ACTIVE	CERCLA	Q	Qrf	U	5976.4	5978.06	27.3	15.3	25.3	23.0
146	09091	748918	2085943	903 Pad	ACTIVE	CERCLA	Q	Qrf	U	5975.2	5976.79	26.7	14.7	24.7	24.0
147	09691	748572	2086038		ACTIVE	CERCLA	Q	Kslts & Kclst	U?	5935.6	5937.05	16.0	6.0	14.0	3.1
148	12091	749436	2086009		ACTIVE	CERCLA	Q	Kslts	U?	5971.6	5973.27	24.0	14.0	22.0	13.2

TABLE 4-3
Industrial Area IM/IRA/DD
Status of Monitoring Wells in the Industrial Area at Rocky Flats Plant
October 14, 1993

149	12291	749429	2085441		ACTIVE	CERCLA	Q	Kcss & Kss	U?	5971.0	5972.73	16.1	7.1	14.1	2.0
150	13091	748960	2085992	903 Pad	ACTIVE	CERCLA	Q	Qrf	U	5973.7	5975.20	23.3	11.3	21.3	19.5
151	13191	749071	2085530		ACTIVE	CERCLA	Q	Ksclst	L?	5978.3	5979.90	27.7	15.7	25.7	15.4
152	13291	749060	2085523		ACTIVE	CERCLA	Q	Qrf	U	5978.5	5979.97	17.7	5.7	15.7	15.4
153	20591	749405	2086316	NE Trenches	INACTIVE	Special Purpose	N	Qrf	U	5968.0	5969.61	24.6	4.1	24.1	24.5
154	20691	749411	2086317		INACTIVE	Special Purpose	N	Qrf	U	5968.1	5969.63	25.0	4.5	24.5	24.5
155	20791	749416	2086318	NE Trenches	INACTIVE	Special Purpose	N	Kclst & Ksclst	L?	5967.9	5969.49	36.5	29.5	34.5	24.5
156	33491	748080	2084883	IHSS 119.1	ACTIVE	CERCLA	Q	Qc & Ksclst	U	5926.1	5928.59	11.1	6.7	8.7	8.0
157	33691	748112	2084994	IHSS 119.1	ACTIVE	CERCLA	Q	Qc	U	5927.0	5929.24	10.6	6.2	8.1	7.8
158	33891	747961	2084641	IHSS 119.1	ACTIVE	CERCLA	Q	Qc & Kclst	U	5927.5	5929.94	11.1	6.7	8.7	8.1
159	34591	748462	2085621	IHSS 119.2	ACTIVE	CERCLA	Q	Qc & Kclst	U	5952.2	5954.63	11.3	6.9	8.9	8.2
160	34791	748377	2085521	IHSS 119.2	ACTIVE	CERCLA	Q	Qc	U	5951.4	5953.91	10.4	6.0	8.0	8.0
161	35391	748011	2083907	IHSS 177	ACTIVE	CERCLA	Q	Kclst	L?	5960.7	5963.03	10.5	6.1	8.1	6.0
162	35991	748057	2083756	IHSS 145	ACTIVE	CERCLA	Q	Qc	U	5973.3	5976.45	16.1	8.7	13.7	12.2
163	36191	748091	2084198	IHSS 103	ACTIVE	CERCLA	Q	Qc	U	5962.9	5965.17	17.0	9.5	14.6	14.0
164	36391	748042	2084294	IHSS 130	ACTIVE	CERCLA	Q	Qrf	U	5964.6	5967.01	29.8	17.4	27.4	26.4
165	36691	748027	2084421	IHSS 130	ACTIVE	CERCLA	Q	Qc	U	5949.8	5951.52	27.8	15.8	25.8	25.0
166	36991	748180	2084177	IHSS 103	ACTIVE	CERCLA	Q	Qrf & Kclst	U	5969.5	5972.31	10.6	6.6	8.6	8.0
167	37191	748036	2084533	IHSS 130	ACTIVE	CERCLA	Q	Qc	U	5945.9	5948.29	23.1	11.1	21.1	20.5
168	37591	748580	2084610	Upgradient OU1	ACTIVE	CERCLA	Q	Qrf	U	5991.4	5993.45	14.6	7.6	12.6	12.0
169	37691	748692	2085217	Upgradient OU1	ACTIVE	CERCLA	Q	Qrf	U	5984.5	5985.24	18.5	6.5	16.5	16.2
170	37791	748592	2083753	Upgradient OU1	ACTIVE	CERCLA	Q	Qrf	U	6002.2	6004.18	22.6	10.6	20.6	20.0
171	37891	748075	2084915	IHSS 119.1, 130	ACTIVE	CERCLA	Q	Kcsltst & Ksltst	L?	5925.2	5926.29	55.2	43.2	53.2	4.7
172	37991	748063	2084731	IHSS 119.1, 130	ACTIVE	CERCLA	Q	Kcsltst & Kssltst	U?	5931.5	5933.55	57.2	45.2	55.2	6.9
173	38191	748014	2084765	IHSS 119.1	ACTIVE	CERCLA	Q	Qc	U	5924.5	5926.40	17.0	10.0	15.0	14.7
174	38291	748032	2084801	IHSS 119.1	ACTIVE	CERCLA	Q	Qc	U	5924.5	5926.71	10.7	6.7	8.7	8.4
175	39691	748357	2083634	Upgradient OU1	ACTIVE	CERCLA	Q	Qrf & Kclst	U	6006.3	6008.37	11.0	7.0	9.0	8.0
176	75992	750290	2086628	West Spray Field	ACTIVE		Q	Qc	U	5897.1	5899.10	12.0	5.0	10.0	10.0
177	76192	750660	2086122	West Spray Field	ACTIVE		Q	Qrf	U	5960.0	5963.00	8.0	4.0	6.0	6.0
178	76292	750769	2085681	West Spray Field	ACTIVE		Q	Kcss	U?	5957.0	5959.30	21.2	9.2	19.2	8.5
179	77492	751246	2083508	PA	ACTIVE			Qrf	U	5942.0	5944.50	24.1	12.1	22.1	22.5
180	05093	750804	2085231	PA	ACTIVE	RCRA		Qrf	U	5963.3	5965.54	12.5	3.5	10.5	9.7
181	05293	750198	2084490	PA	ACTIVE	RCRA		Qrf	U	5980.7	5983.11	9.7	2.7	7.7	6.6
182	22093	748623	2085973		ACTIVE			Kclst,Kcslt,Ksltss	U?	5945.0	5947.43	66.3	48.0	63.0	8.8
183	22393	749564	2086121		ACTIVE			Kcslst & Kclst	L?	5969.3	5972.14	121.3	108.2	118.0	19.7

STATE NORTH = state plane coordinates, Northing.

FINAL

TABLE 4-3
Industrial Area IM/IRA/DD
Status of Monitoring Wells in the Industrial Area at Rocky Flats Plant
October 14, 1993

STATE EAST = state plane coordinates, Easting.

OPWL = original process waste line
PA = Protected Area

WELL CLASSIFICATION:
RCRA-C = RCRA characterization monitoring wells-- information used to determine the rate and extent of migration of hazardous waste
RCRA-S = monitoring wells used for RCRA statistical comparisons [40 CFR 265.93(b) and 265.94(a)(2)(II)]
CERCLA = monitoring wells specified in RFI/RI work plans. Industrial Area IM/IRA characterization wells will convert to "Plant Protection" wells.

S. FR. = Sampling frequency:
Q = quarterly N = not sampled

HYDROSTRATIGRAPHIC UNIT:
U = upper
L = lower

TABLE 4-3
Industrial Area IM/IRA/DD
Status of Monitoring Wells in the Industrial Area at Rocky Flats Plant
October 14, 1993

SURFACE ELEV. = elevation of land surface at well head, in feet above mean sea level.
TOP OF CASING = elevation of top of well casing, in feet above mean sea level.
TD = total depth of casing, measured in feet below ground surface.
TOP SCRN = top of screened interval, measured in feet below ground surface.
BOT SCRN = bottom of screened interval, measured in feet below ground surface.
TOP BEDROCK = top of bedrock, measured in feet below ground surface.

COMPLETION UNIT/LITHOLOGY = rock type in which well is screened:

- Kss = Cretaceous sandstone
- Kclst = Cretaceous claystone
- Kcslt = Cretaceous clayey siltstone
- Kcss = Cretaceous clayey sandstone
- Ksclst = Cretaceous sandy claystone
- Kslt = Cretaceous siltstone
- Ksltclst = Cretaceous silty claystone
- Ksltss = Cretaceous silty sandstone
- Ksslt = Cretaceous sandy siltstone
- Qa = Quaternary alluvium
- Qc = Quaternary colluvium
- Qrf = Quaternary Rocky Flats Alluvium

samples have been collected quarterly from all active wells in the monitoring network. During fiscal year 1995, many wells will be sampled semiannually. Table 4-3 lists each monitoring well in the Industrial Area (as of October 14, 1993), the status of the well (active, inactive, or abandoned), the program to which the well belongs (RCRA, CERCLA, Background, Boundary, or Special Purpose) and the frequency of sampling (quarterly or not sampled). All active wells are measured for water levels but may or may not be sampled.

The monitoring well network undergoes constant evaluation to determine the most effective approach to sampling groundwater at RFP. This evaluation takes into account current regulations and streamlines the sampling program to meet those requirements in the most efficient manner.

4.3.3 Analytes

Every monitoring well in the sampling network is subject to the same suite of analytes. The analytical constituents have been selected based on EPA and CDH requirements, technical needs, and the history of operations at RFP. The practice of sampling all wells for the same analytical suite has been reviewed (EG&G 1993a) and recommendations have been made to consider reducing wells to location-specific analytical suites, where appropriate.

The RFP standard analytical suite for groundwater samples consists of the following analytes and analyte groups:

- TCL VOCs;
- water quality parameters (indicators, field parameters, and selected anions);
- nitrate/nitrite as nitrogen;
- gross alpha, gross beta, uranium, cesium, radium, and strontium (dissolved);

- CLP TAL standard and additional metals (dissolved);
- tritium, plutonium, americium (total);
- cyanide; and
- orthophosphate.

This standard suite is itemized in more detail in Table 4-4. SVOCs are analyzed only during the first quarter after installation of a new well.

4.3.4 Sampling Procedures

The SOP for groundwater sampling (EG&G 1992a) describes the procedures required for the collection of all groundwater samples. The procedures are designed to avoid contamination of groundwater samples by foreign materials, ensure representative samples, minimize the potential for cross-contamination of samples or wells, and ensure reproducibility of results. Limited sample volumes are sometimes available because of the low yield of the water-bearing formations at RFP. For this reason, the analyses are prioritized and samples for each analytical method are collected in consistently the same order.

4.4 PATHWAY ANALYSIS

The following sections evaluate the potential for the upper and lower hydrostratigraphic units to act as pathways for contaminant transport.

4.4.1 Upper Hydrostratigraphic Unit as a Pathway

The upper hydrostratigraphic unit may be a pathway for transport of contaminants released at ground surface or in the shallow subsurface. Chemical constituents from

TABLE 4-4
Industrial Area IM/IRA/DD
Chemical Constituents Monitored in Groundwater at Rocky Flats Plant

Metals	**Organics**[a]	**Radionuclides**[b]
Cesium (Cs)	Target Compound List-Volatiles	Gross Alpha
Lithium (Li)[c]	Chloromethane (CH_3Cl)	Gross Beta
Molybdenum (Mo)	Bromomethane (CH_3Br)	Uranium-233, -234,-235, and -238
Strontium (Sr)	Vinyl Chloride (C_2H_3Cl)	Americium-241
Tin (Sn)[d]	Chloroethane (C_2H_5Cl)	Plutonium-239, -240
	Methylene Chloride (CH_2Cl)	Strontium-89, -90[e]
Target Analyte List	Acetone	Cesium-137
Aluminum (Al)	Carbon Disulfide	Tritium (H-3)
Antimony (Sb)	1,1-Dichloroethane (1,1-DCA)	Radium-226, -228[f]
Arsenic (As)	1,1-Dichloroethene (1,1-DCE)	
Barium (Ba)	trans 1,2-Dichloroethene	**Indicators**
Beryllium (Be)	1,2-Dichloroethene (total) (total 1,2-DCE)	Total Dissolved Solids (TDS)
Cadmium (Cd)	Chloroform ($CHCl_3$)	pH[d]
Calcium (Ca)	1,2-Dichloroethane (1,2-DCA)	
Chromium (Cr)	2-Butanone (MEK)	**Field Parameters**
Cobalt (Co)	1,1,1-Trichloroethane (1,1,1-TCA)	pH
Iron (Fe)	Carbon Tetrachloride (CCl_4)	Specific Conductance
Lead (Pb)	Vinyl Acetate	Temperature
Magnesium (Mg)	Bromodichloromethane	Dissolved Oxygen
Manganese (Mn)	1,1,2,2,-Tetrachloroethane	Alkalinity
Mercury (Hg)	1,2-Dichloropropane (1,2-DCP)	
Nickel (Ni)	trans-1,3-Dichloropropene	**Anions**
Potassium (K)	Trichloroethene (TCE)	Carbonate (CO_3)
Selenium (Se)	Dibromochloromethane	Bicarbonate (HCO_3)
Silver (Ag)	1,1,2-Trichloroethane	Chloride (Cl)
Sodium (Na)	Benzene	Sulfate (SO_4)
Thallium (Tl)	cis-1,3-Dichloropropene	Nitrate/Nitrite (NO_2/NO_3 as N)
Vanadium (V)	Bromoform (CBr_4)	Cyanide (CN)[g]
Zinc (Zn)	2-Hexanone	Fluoride (F)
	4-Methyl-2-pentanone	Orthophosphates (PO_4)
	Tetrachlorethene (PCE)	
	Toluene (C_7H_8)	
	Chlorobenzene (C_6H_5Cl)	
	Ethyl Benzene	
	Styrene	
	Total Xylenes	

a. Not analyzed in background samples in 1989.
b. Dissolved radionuclides replaces total radionuclides (except tritium) beginning with the third quarter 1987; however, total Pu and Am were collected starting in third quarter 1988.
c. Before 1989, lithium was only analyzed during fourth quarter 1987 and first quarter 1988.
d. Not analyzed before 1989.
e. Strontium-89, -90 was not analyzed during first quarter 1988.
f. Not analyzed before 1989, and only analyzed if gross alpha exceeds 5 pCi/l.
g. Cyanide was not analyzed during fourth quarter 1987.

Total suspended solids and phosphate were analyzed in 1986 only; orthophosphates were analyzed in 1990 and in 1991.
Chromium (VI) was analyzed during fourth quarter 1987 only.

surficial spills may be leached through the permeable surficial soils to the water table, by infiltrating precipitation. Upon reaching the water table, groundwater flows in the directions discussed in Section 4.2.1. Water from the upper hydrostratigraphic unit may evaporate or seep out to become surface water at the wetland/seep locations indicated on Plates 4-1 and 4-2. A lesser amount of groundwater also infiltrates into the lower hydrostratigraphic unit.

4.4.2 Lower Hydrostratigraphic Unit as a Pathway

Several factors must be considered in the analysis of the lower hydrostratigraphic unit as a potential contaminant pathway. The low hydraulic conductivity and high adsorptive properties of the Arapahoe/Laramie Formation claystone and siltstone may preclude them from consideration as a significant contaminant pathway. However, the sandstone units have higher permeabilities and documented contamination (EG&G 1993e). The OU2 RFI/RIs concluded that the bedrock pathways are incomplete. However, building footing drains that are completed in bedrock (not a concern in the vicinity of OU2) may provide channels for UBC through bedrock in the Industrial Area. Proposed monitoring of building sumps and footing drains is described in Section 7.6.

The bedrock was investigated as a potential exposure pathway during OU2 RI/RFI activities. The study indicated that the pathway in the lower hydrostratigraphic unit was considered to be incomplete for the OU2 area. However, chlorinated hydrocarbons such as carbon tetrachloride, tetrachloroethene (PCE), and trichloroethene (TCE) were detected in both the lower hydrostratigraphic sandstone units and the upper hydrostratigraphic unit (EG&G 1993b). Potential sources of contamination to the lower hydrostratigraphic unit were believed to be limited to secondary contaminant plumes in the upper hydrostratigraphic unit. Two scenarios for contaminant migration to the lower hydrostratigraphic unit were investigated: (1) lateral migration of contaminants from the upper hydrostratigraphic unit to discharge points beneath the colluvium along Woman

Creek with recharge from the colluvium to subcropping Laramie Formation sandstone units, and (2) vertical migration of contamination from the upper hydrostratigraphic unit to the sandstones in the lower hydrostratigraphic unit, where Laramie Formation sandstones are in vertical proximity to the upper aquifer. Contamination of the bedrock was believed to be associated with scenario 1, which is an upper hydrostratigraphic unit exposure pathway.

The low permeability and discontinuous nature of the Laramie Foundation sandstones suggest that there is no viable migration pathway for contaminants in the sandstones to reach ground surface, although data on the spatial distribution of the sandstones are not complete and highly fractured areas of claystone could allow vertical migration of dense nonaqueous-phase liquids (DNAPLs). The lower hydrostratigraphic unit should not be completely ruled out as a potential migration pathway. However, the thickness and low vertical hydraulic conductivity of the Laramie Formation will likely impede the downward movement of chemical constituents and prevent contamination of the Laramie-Fox Hills aquifer.

The lower hydrostratigraphic unit is being investigated as part of the studies at various OUs in the Industrial Area. Any parallel investigation of the lower hydrostratigraphic unit is beyond the scope of the IM/IRA. As discussed more completely in Section 9.0, groundwater monitoring for this IM/IRA will focus on the upper hydrostratigraphic unit in the immediate vicinity of D&D activities. In the unlikely event of a contaminant release to groundwater during D&D, the preprogrammed response (Section 9.5.1) will initiate an investigation into the source of contamination observed in groundwater, as necessary. Depending on the location, amount, and type of contamination released, the investigation may include potential pathways in the lower hydrostratigraphic unit. Any investigation of the lower hydrostratigraphic unit that is required will be coordinated by the appropriate OU program.

4.5 SUMMARY OF EXISTING DATA

Analytical data and existing reports were evaluated for development of the IM/IRA groundwater monitoring program. Existing data and reports are summarized in this section. Some of the analytical data presented represent unvalidated results.

4.5.1 Existing Reports

Groundwater sampling results are reported under the respective sampling programs, and the information is entered into the Rocky Flats Environmental Database System (RFEDS). The four primary reports that contain RFP groundwater data are (1) the *Rocky Flats Plant Site Environmental Report, January through December 1992* (EG&G 1993c), which is required by DOE and has been published for approximately 20 years, (2) the *Annual RCRA Groundwater Monitoring Report for Regulated Units at Rocky Flats Plant* (EG&G 1993f), (3) the *Background Geochemical Characterization Report*, Final, (EG&G 1992b), and (4) the recent *Well Evaluation Report* (EG&G 1993a).

The Annual RCRA Groundwater Reports only address the RCRA Interim Status regulated units that require groundwater monitoring. These are the Solar Ponds (OU4), the Present Landfill (OU7), and West Spray Field (OU11). Various other reports are produced for RCRA and CERCLA investigations and remedial activities.

The *Well Evaluation Report* (EG&G 1993a) examined groundwater geochemical data to determine the site-wide extent, magnitude, spatial distribution, and temporal variation of contaminant distributions in groundwater at RFP. Concentration contour maps for selected analytes were presented in the *Well Evaluation Report* using data from the spring and fall of 1990 and 1992. Monitoring wells in active RCRA, CERCLA, and background programs were analyzed during those sampling rounds. The eastern portion of the Industrial Area was covered in detail, but relatively few groundwater samples were collected for analysis in the west and central portions of the Industrial Area.

The contour maps in the *Well Evaluation Report* (EG&G 1993a) displayed the concentrations of lithium, selenium, gross alpha, gross beta, uranium-233, uranium-234, plutonium-239, plutonium-240, americium-241, TCE, PCE, total VOCs, TDS, nitrate plus nitrite, and sulfate. Separate concentration contour maps were prepared for wells installed in unconsolidated surficial deposits and in shallow bedrock. For this purpose, shallow bedrock wells were defined as wells in which the top of the screened interval is within the upper 40 feet of bedrock. This interval of bedrock includes the weathered portion, where most bedrock contamination is thought to occur (EG&G 1993a).

The distribution of contaminants in groundwater from alluvial wells was compared with that from shallow (less than 40 feet) bedrock wells. The distributions were correlative, and "most well-defined groundwater contaminant plumes exist in both the unconsolidated surficial deposits and in bedrock" (EG&G 1993a). Groundwater concentrations of lithium, TCE, TDS, and nitrate plus nitrite were often higher in bedrock groundwater than in alluvial groundwater. This suggests that the alluvial and shallow bedrock units are in hydraulic connection, and that hydraulic gradients, at least locally, may be downward. Higher PCE and TCE in bedrock groundwater could indicate the presence of DNAPL in the bedrock.

The *Well Evaluation Report* did not incorporate all of the data for wells in the Industrial Area. Some of the piezometers are not sampled regularly, and other groundwater data were screened from consideration. The fact that high concentrations of analytes are not observed in the western and west-central Industrial Area may be attributable to lack of data, rather than lack of chemical constituents.

4.5.2 Analytical Results, Previous Groundwater Sampling

To better characterize groundwater chemistry in the Industrial Area, RFEDS data for piezometers installed in 1989 were examined as part of this IM/IRA. The piezometers had been initially installed for the purpose of collecting groundwater level measurements to determine hydraulic gradients at RFP, and thus were classified as piezometers rather than wells. However, groundwater samples had been collected from piezometers under the Environmental Monitoring and Assessment Division (EMAD), GPMP, OU9 RFI/RI, and surface water programs in 1989, 1990, and 1991. From this data set, the chemical constituents detected during the 1991 sampling event from each piezometer are tabulated in Appendices 4.2, 4.3, and 4.4.

4.5.3 Analytical Results, IM/IRA Special Purpose Well Sampling Event

Special purpose groundwater monitoring wells and piezometers in the Industrial Area were sampled for Industrial Area IM/IRA characterization during November and December 1993. Analytical results for dissolved metals from 22 wells (presented in Table 4-5), total metals from 21 wells (Table 4-6), and SVOCs from 29 wells (Table 4-7) were received. Analytical results for volatile organic compounds from 35 wells are presented in Table 4-8A. The volatile organic results for an additional 38 wells sampled in October and November 1993 are presented in Table 4-8B. Selected results from these 73 wells in the Industrial Area are presented in Figure 4-4. Results for total and dissolved radionuclides from 32 and 24 wells, respectively, are presented in Table 4-9. Figure 4-5 presents results of total gross alpha and total gross beta for 21 Industrial Area wells.

TABLE 4-5
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Dissolved Metals

LOCATION ID: DATE SAMPLED:	1986 17 Nov 1993	2186 19 Nov 1993	6186 19 Nov 1993	P114389 18 Nov 1993	P114689 23 Nov 1993	P114789 22 Nov 1993
ALUMINUM	<40	<40	<21	<40	<40	<40
ANTIMONY	<36	<36	<16	<36	<36	<36
ARSENIC	5 BW	<2 W	<1	<2 W	<2 W	3 B
BARIUM	149 B	135 B	121 B	184 B	152 B	155 B
BERYLLIUM	<1	<1	<1	<1	<1	<1
CADMIUM	<3	<3	<3	<3	<3	<3
CALCIUM	116000	44100	71600	126000	95900	104000
CESIUM	<40	<40	<63	<37	<31	<30
CHROMIUM	<3	<3	<3	<3	<3	<3
COBALT	<7.6	<5	<3	<5	<5	<5
COPPER	<4	<4	<2	<4	<4	<4
IRON	8810	<9	<5.1	<9	<9	<22.5
LEAD	<1	<1	<1	<1	<1	<1
LITHIUM	<30	<30	8.4 B	<30	<30	<30
MAGNESIUM	32800	10400	12200	27300	15900	16700
MANGANESE	2460	<23.1	<1	398	<7	<3.3
MERCURY	<0.2	<0.2*	<0.2	<0.2*	1.3	<0.2
MOLYBDENUM	<15	<15	<6	<15	<15	<15
NICKEL	<10	<10	<8	<10	<10	<10
POTASSIUM	1510 B	2110 B	1100 B	<670	1030 B	1080 B
SELENIUM	<2 W	<2	<2	<2 W	<2 WN	<2 WN
SILICON	9650	4690	6260	10800	9620	9350
SILVER	<4	<4	<3	<4	<4	<4
SODIUM	169000	31300	10500	112000	24400	24400
STRONTIUM	863	389	397	846	537	565
THALLIUM	<3 W	<3 W	<2	<3 W	<3 W	<3
TIN	58.2 B	<29	<21	38.8 B	38.2 B	<29
VANADIUM	<5	<5	<2	<5	<5	<5
ZINC	3.3	<8.9	<6	<6.2	<3	18.5 B

Results are reported in micrograms per liter
< = Analyte not detected; associated value is the instrument detection limit
W = Post-digest spike outside of control limits
B = Greater than method detection limits but less than instrument detection limits
N = Spiked recovery was not within control limits
E = Estimated due to interference

TABLE 4-5
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Dissolved Metals

LOCATION ID: DATE SAMPLED:	P114989 23 Nov 1993	P115089 21 Nov 1993	P115489 17 Nov 1993	P115589 22 Nov 1993	P115689 22 Nov 1993	P218289 21 Nov 1993
ALUMINUM	<60.6	<40	<40	<40	<40	<21
ANTIMONY	<16.4	<36	<36	<36	<36	<16
ARSENIC	<1	<2 W	<2 W	3.6 BW	3.4 BW	<1
BARIUM	70.4 B	90 B	137 B	163 B	273	264
BERYLLIUM	<1	<1	<1	<1	<1	<1
CADMIUM	<3	<3	<3	<3	<3	<3
CALCIUM	25000	37200	87300	105000	170000	142000
CESIUM	<63	<21	43	<31	<30	<63
CHROMIUM	<3	<3	<3	<3	<3	<3
COBALT	<3	<5	<5	<5	<5	<3
COPPER	3.4 B	5 B	<4	<4	5.1 B	<2
IRON	<30.3	<20.1	<9	<9	<9	<4
LEAD	<2	<1	<1	<1	<1	<2
LITHIUM	10.9 B	<30	<30	<30	<30	9 B
MAGNESIUM	6000	7540	12900	17500	20000	18200
MANGANESE	<10	81	5	<7.8	323	28
MERCURY	<0.2	<0.2	<0.2*	<0.2	1	1
MOLYBDENUM	10 B	<15	<15	<15	<15	<6
NICKEL	8	<10	11.5 B	<10	<10	<8
POTASSIUM	1160 B	1090 B	706 B	1700 B	1110 B	1060 B
SELENIUM	<1	<2 WN	<2 W	<2 WN	<2 WN	<1
SILICON	8460	13000	9510	9750	8400	10000
SILVER	<3	<4	<4	<4	<4	<3
SODIUM	29600	18900	16200	44700	49900	30300
STRONTIUM	220	242	425	607	707	592
THALLIUM	1	<3	<3	<3 W	<3 W	<1
TIN	<21	29.5 B	<29	<29	72.6 B	<21
VANADIUM	<2	<5	<5	<5	<5	<2
ZINC	<9	<3	<6.5	<3	<5.3	<7.5

Results are reported in micrograms per liter
< = Analyte not detected; associated value is the instrument detection limit
W = Post-digest spike outside of control limits
B = *Greater than* method detection limits but less than instrument detection limits
N = Spiked recovery was not within control limits
E = Estimated due to interference

FINAL

TABLE 4-5
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Dissolved Metals

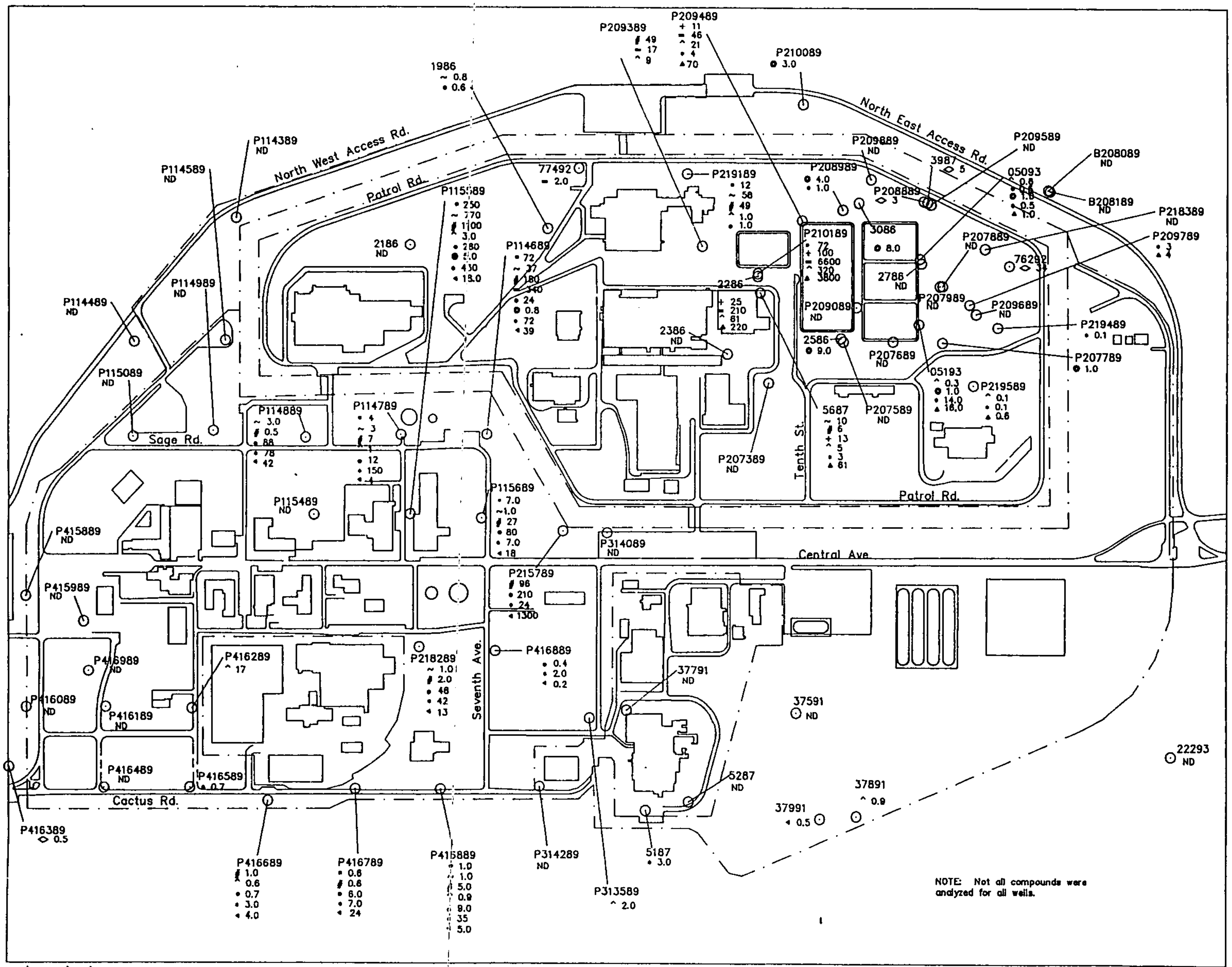
LOCATION ID: DATE SAMPLED:	P313489 16 Nov 1993	P313589 16 Nov 1993	P415889 18 Nov 1993	P415989 21 Nov 1993	P416089 23 Nov 1993	P416189 21 Nov 1993
ALUMINUM	<40	<40	<40	<40	<21.7	<40
ANTIMONY	<36	<36	<36	<36	<22	<36
ARSENIC	<2 W	<2 W	<2 W	2.3 BW	<1	<2 W
BARIUM	154 B	230	80.5 B	139 B	76.1 B	165 B
BERYLLIUM	<1	<1	<1	<1	<1	<1
CADMIUM	<3	<3	<3	<3	<3	<3
CALCIUM	100000	148000	49300	63800	42700	95000
CESIUM	<36	<39	45	<23	<63	<18
CHROMIUM	<3	<3	<3	<3	<3	<3
COBALT	<5	<5	<5	5.2 B	<3	<5
COPPER	<4	<4	<4	<4	<2	<4
IRON	<9	<9	<9	470	<4.1	<9
LEAD	<1	<1	<1	<1	<2	<1
LITHIUM	<30	<30	<30	<30	8 B	<30
MAGNESIUM	11900	31400	8890	10500	7690	9990
MANGANESE	<3.8	<12	2.9	1140	<2.6	<2
MERCURY	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
MOLYBDENUM	<15	<15	<15	<15	<6	<15
NICKEL	<10	69.2	<10	11.4 B	<8	<10
POTASSIUM	1260 B	939 B	<670	993 B	638 B	<670
SELENIUM	<2	<2	<2 W	<2 WN	<1	<2 WN
SILICON	6950	7500	12100	12700	11000	9400
SILVER	<4	<4	<4	<4	<3	<4
SODIUM	20300	35400	11200	20200	11600	8210
STRONTIUM	425	1110	285	310	232	353
THALLIUM	<3	<3	<3	<3	<1	<3
TIN	<29	<29	<29	30.4 B	<21	<29
VANADIUM	<5	<5	<5	<5	<2	<5
ZINC	<3.8	11.7	7.7	<3	<9.2	<3

Results are reported in micrograms per liter
< = Analyte not detected; associated value is the instrument detection limit
W = Post-digest spike outside of control limits
B = Greater than method detection limits but less than instrument detection limits
N = Spiked recovery was not within control limits
E = Estimated due to interference

TABLE 4-5
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Dissolved Metals

LOCATION ID: DATE SAMPLED:	P416389 23 Nov 1993	P416489 22 Nov 1993	P416589 21 Nov 1993	P416989 23 Nov 1993
ALUMINUM	<40	<40	<40	<40
ANTIMONY	<36	<36	<36	<36
ARSENIC	<2 W	<2 W	2.2 B	<2 W
BARIUM	153 B	228	107 B	89.6 B
BERYLLIUM	<1	<1	<1	<1
CADMIUM	<3	<3	<3	<3
CALCIUM	70600	123000	70700	21100
CESIUM	<34	<35	<21	<35
CHROMIUM	<3	<3	<3	<3
COBALT	<5	<5	<5	<5
COPPER	<4	<4	<4	<4
IRON	<9	<9	13.6	<9
LEAD	<5 E	<1	<1	<5 E
LITHIUM	<30	<30	<30	<30
MAGNESIUM	7710	10800	10000	5420
MANGANESE	<4.9	<2	<3.4	15.3
MERCURY	<0.2	<0.2	<0.2	<0.2
MOLYBDENUM	<15	<15	<15	<15
NICKEL	<10	<10	<10	<10
POTASSIUM	<670	1310 B	<670	3240 B
SELENIUM	<2 WN	<2 WN	<2 WN	<2 N
SILICON	9180	8900	10400	4790
SILVER	<4	<4	<4	<4
SODIUM	12500	14500	9530	58200
STRONTIUM	286	375	341	306
THALLIUM	<3	<3	<3	<3 W
TIN	32.1 B	<29	30 B	<29
VANADIUM	<5	<5	<5	<5
ZINC	<3	<3	<9	<4.5

Results are reported in micrograms per liter
< = Analyte not detected; associated value is the instrument detection limit
W = Post-digest spike outside of control limits
B = Greater than method detection limits but less than instrument detection limits
N = Spiked recovery was not within control limits
E = Estimated due to interference



U.S. Department of Energy

Rocky Flats Plant

EXPLANATION

- ⊙ Well
- • 72 1,1,1 – Trichloroethane
- ~ 5.0 1,1 – Dichloroethane
- 6 1,1 – Dichloroethene
- + 13 1,2 – Dichloroethene
- = 210 Carbon Tetrachloride
- ^ 5 Chloroform
- ◇ 0.5 cis – 1,2 – Dichloroethene
- ⊘ 9.0 Methylene Chloride
- • 3 Tetrachloroethene
- ▲ 81 Trichloroethene

Results in micrograms per liter

- Paved Road
- Fence
- Building/Structure

FIGURE 4-4
INDUSTRIAL AREA IM/IRA/DD

Groundwater Analytical Results
Fourth Quarter 1993
Volatile Organic Compounds

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

(intentionally blank)

TABLE 4-6
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Total Metals

LOCATION: DATE SAMPLED:	1986 17 Nov 1993	2186 18 Nov 1993	6186 19 Nov 1993	P114689 23 Nov 1993	P114789 22 Nov 1993	P114989 23 Nov 1993	P115089 21 Nov 1993	P115489 17 Nov 1993
ALUMINUM	13300 N	2780 N	6940 N	38200	22800	338000 N	20600	113000 N
ANTIMONY	<36	<36	<16	<36	<36	<16	<36	<36
ARSENIC	8 B	<2	<1	6 BWN	4.4 BWN	17	4.4 BWN	6.4 B
BARIUM	229	176 B	208	396	427	6030	203	1150
BERYLLIUM	<1	<1	<1	3 B	1.8 B	32	1.4 B	7.4
CADMIUM	<3	<3	<3	<3	<3	<3	<3	<3
CALCIUM	122000	46500	70700	104000	109000	303000	42800	123000
CESIUM	<27	<25	<63	<18	<14	<130	<13	<40
CHROMIUM	48.8	29.4	24	44	27.4	238	25.2	153
COBALT	9.2 B	<5	<4.8	<16.9	<14.3	268	<9.4	52.1
COPPER	15.2 B	8.2 B	7 B	40	34.7	478	23.6 B	138
IRON	24200	2380	5480	45100	32900	242000	22000	175000
LEAD	7.1	3 B	5	18	17.2	638	15	42.4
LITHIUM	<30	<30	10 B	<30	<30	191	<30	64.3 B
MAGNESIUM	37600	11300	12400	22500	21500	111000	11500	36200
MANGANESE	2550	63.4	111	433	683	4250	350	2490
MERCURY	<0.2	<0.2	<0.2	2	<0.2	1	<0.2	<0.2
MOLYBDENUM	<15	<15	<6	<15	<15	<24	<15	<15
NICKEL	21.6 B	18.1 B	14 B	33 B	25.7 B	211	13.9 B	148
POTASSIUM	3620 B	3010 B	2370 B	5420	4620 B	24300	2890 B	13500
SELENIUM	<2 WN	<2 WN	<2	<2 WN	<2 WN	<5	<2 WN	<10 N
SILICON	38200	10500	20000	74000	50600	95600	50000	150000
SILVER	<4	<4	<3	<4	<4	<3	<4	<4
SODIUM	184000	35100	10900	27400	25700	45400	21700	20300
STRONTIUM	919	415	390	629	633	3460	292	728
THALLIUM	<3	<3	<2	<3	<3	2 N	<3	<3
TIN	<29	<29	<21	<59.7	<62.6	<21	<57.9	122 B
VANADIUM	32.6 B	8.3 B	31 B	79	59.3	411 E	42 B	346
ZINC	48.6	31.4	33	145	143	1270	87.1	352

Results are reported in micrograms per liter
< = Analyte not detected; associated value is the instrument detection limit
W = Post-digest spike outside of control limits
B = Greater than method detection but less than instrument detection limits
N = Spiked recovery not within control limits
E = Estimated due to interference

TABLE 4-6
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Total Metals

LOCATION: DATE SAMPLED:	P115589 22 Nov 1993	P115689 22 Nov 1993	P218289 21 Nov 1993	P313489 16 Nov 1993	P313589 16 Nov 1993	P415889 18 Nov 1993	P415989 21 Nov 1993	P416089 23 Nov 1993
ALUMINUM	34400	84200	6760 N	7370 N	15900 N	39500 N	65500	74900 N
ANTIMONY	<36	<36	<16	<36	<36	<36	<36	<16
ARSENIC	8.2 BWN	8.4 BWN	<1	<2 W	<2 W	<2 W	5.6 BWN	2 B
BARIUM	405	844	305	216	358	285	588	621
BERYLLIUM	2.5 B	5.9	<1	<1	1.2 B	1.8 B	4.8 B	<5.1
CADMIUM	<3	<3	<3	<3	<3	3.2 B	<3	<3
CALCIUM	115000	215000	143000	103000	163000	56400	80300	59700
CESIUM	<15	<21	<63	<20	<20	<30	<21	<63
CHROMIUM	45.8	78.4	10	7.1 B	25.4	56.4	92.1	107
COBALT	<19.2	42.7 B	5 B	<5	7.3 B	19.5 B	39.6 B	44 B
COPPER	49	97.7	<7	12.6 B	16.1 B	33	66.5	73
IRON	46300	93300	6110	6580	20600	36100	74600	86900
LEAD	24.4	41.6	3	<7.7	11.2	10.6	29.3	35
LITHIUM	<30	50.4 B	11 B	<30	<30	32.4 B	41.5 B	55 B
MAGNESIUM	24600	37600	19100	13500	37200	17000	22900	22600
MANGANESE	640	1030	165	209	325	962	2270	1290
MERCURY	0.39	3.6	1	<0.2	<0.2	<0.2	1.7	<0.2
MOLYBDENUM	<15	<15	<13.8	<15	<15	<15	<15	<9.4
NICKEL	47.4	94.2	<8	<10	105	49.8	67.2	72
POTASSIUM	5480	11400	1950 B	2660 B	3590 B	5690	8660	11100
SELENIUM	<10 WN	<10 WN	<1	<2 WN	<2 WN	<2 WN	<10 N	<1
SILICON	70300	120000	24500	21500	41400	87200	87600	131000
SILVER	<4	<4	<3	<4	<4	<4	<4	<3
SODIUM	48400	57500	29300	23500	35300	14200	23500	11500
STRONTIUM	721	933	593	454	1250	380	428	426
THALLIUM	<3	<3	<2 WN	<3	<3	<3	<3	<2 N
TIN	<67.5	<73.8	<21	<29	<29	41.6 B	<72	<21
VANADIUM	93.1	182	38 BE	15.6 B	36.4 B	70.2	141	163 E
ZINC	169	272	33	48.2	61.6	110	179	223

Results are reported in micrograms per liter
< = Analyte not detected; associated value is the instrument detection limit
W = Post-digest spike outside of control limits
B = Greater than method detection but less than instrument detection limits
N = Spiked recovery not within control limits
E = Estimated due to interference

TABLE 4-6
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Total Metals

LOCATION: DATE SAMPLED:	P416189 21 Nov 1993	P416389 23 Nov 1993	P416489 22 Nov 1993	P416689 21 Nov 1993	P416989 23 Nov 1993
ALUMINUM	20500	25200	11200	58400	433
ANTIMONY	<36	<36	<36	<36	<36
ARSENIC	3.6 BWN	5 BN	10.3 N	6.8 BN	<2 WN
BARIUM	309	345	376	656	98.3 B
BERYLLIUM	1.7 B	2 B	1.1 B	4.4 B	<1
CADMIUM	<3	<3	<3	<3	<3
CALCIUM	97000	78300	126000	89900	22700
CESIUM	<14	<18	<14	<24	<13
CHROMIUM	<24.5	<23.8	<17.6	71.7	<3
COBALT	<19.2	<8.2	<11.7	51.9	<5
COPPER	25.4	28	<14	80.9	<7.9
IRON	23600	27200	12100	74000	406
LEAD	12.4	14	11.6	39.8	2.4 B
LITHIUM	<30	<30	<30	39.8 B	<30
MAGNESIUM	13500	12400	12500	22900	5570
MANGANESE	439	372	722	1600	<19.9
MERCURY	0.29	<0.2	<0.2	<0.2	<0.2
MOLYBDENUM	<15	<15	<15	<15	<15
NICKEL	25.4 B	24 B	16.6 B	92.1	<10
POTASSIUM	3720 B	3470 B	4780 B	8420	3280 B
SELENIUM	<2 WN	<2 WN	<2 WN	<2 WN	<2 N
SILICON	46500	56000	31100	77300	5700
SILVER	<4	<4	62.7	80	<4
SODIUM	10700	15100	18200	13200	60600
STRONTIUM	371	352	388	502	309
THALLIUM	<3	<3	<3	<3	<3
TIN	<44.7	<53.6	<46.2	<63.6	<29
VANADIUM	48.6 B	47 B	18.2 B	104	<5
ZINC	93.5	111	72.5	248	48.8

Results are reported in micrograms per liter
< = Analyte not detected; associated value is the instrument detection limit
W = Post-digest spike outside of control limits
B = Greater than method detection but less than instrument detection limits
N = Spiked recovery not within control limits
E = Estimated due to interference

FINAL

TABLE 4-[illegible]
Industrial Area [illegible]D
Groundwater Analytical Results from In[illegible]d Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – S[illegible]volatile Organic Compounds

LOCATION:	1986	2186	6186	P114389	P114489	P114689	P114789	P114989
DATE SAMPLED:	17 Nov 1993	16 Nov 1993	19 Nov 1993	18 Nov 1993	18 Nov 1993	23 Nov 1993	22 Nov 1993	23 Nov 1993
1,2,4-TRICHLOROBENZENE	<10	<10	<10	<10	<10	26	<10	<10
1,2-DICHLOROBENZENE	<10	<10	<10	<10	<10	<10	<10	<10
1,3-DICHLOROBENZENE	<10	<10	<10	<10	<10	<10	<10	<10
1,4-DICHLOROBENZENE	<10	<10	<10	<10	<10	<10	<10	<10
1,4-PENTADIENE, 3,3-DIMETHYL	N/A	N/A	N/A	18 Z1 J	N/A	N/A	N/A	N/A
2,4(1H,3H)-PYRIMIDINEDIONE,	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4,5-TRICHLOROPHENOL	<50	<50	<51	<50	<50	<50	<50	<50
2,4,6-TRICHLOROPHENOL	<10	<10	<10	<10	<10	<10	<10	<10
2,4-DICHLOROPHENOL	<10	<10	<10	<10	<10	<10	<10	<10
2,4-DIMETHYLPHENOL	<10	<10	<10	<10	<10	<10	<10	<10
2,4-DINITROPHENOL	<50	<50	<51	<50	<50	<50	<50	<50
2,4-DINITROTOLUENE	<10	<10	<10	<10	<10	<10	<10	<10
2,6-DINITROTOLUENE	<10	<10	<10	<10	<10	<10	<10	<10
2-CHLORONAPHTHALENE	<10	<10	<10	<10	<10	<10	<10	<10
2-CHLOROPHENOL	<10	<10	<10	<10	<10	<10	<10	<10
2-CYCLOHEXEN-1-ONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2-METHYLNAPHTHALENE	<10	<10	<10	<10	<10	<10	<10	<10
2-METHYLPHENOL	<10	<10	<10	<10	<10	<10	<10	<10
2-NITROANILINE	<50	<50	<51	<50	<50	<50	<50	<50
2-NITROPHENOL	<10	<10	<10	<10	<10	<10	<10	<10
3,3-DICHLOROBENZIDINE	<20	<20 R 41	<20	<20 R 41	<20 R 41	<20 R 40	<20	<20
3-NITROANILINE	<50 R 41	<50 R 40	<51	<50 R 40	<50 R 40	<50	<50	<50
4,6-DINITRO-2-METHYLPHENOL	<50	<50	<51	<50	<50	<50	<50	<50
4-CHLORO-3-METHYLPHENOL	<10	<10	<10	<10	<10	<10	<10	<10
4-CHLOROANILINE	<10 R 40	<10 R 40	<10	<10 R 40	<10 R 40	<10	<10	<10
4-CHLOROPHENYL PHENYL ETHER	<10	<10	<10	<10	<10	<10	<10	<10
4-METHYLPHENOL	<10	<10	<10	<10	<10	<10	<10	<10
4-NITROANILINE	<50 R 41	<50 R 41	<51	<50 R 41	<50 R 41	<50	<50	<50
4-NITROPHENOL	<50	<50	<51	<50	<50	<50	<50	<50
ACENAPHTHENE	<10	<10	<10	<10	<10	<10	<10	<10
ACENAPHTHYLENE	<10	<10	<10	<10	<10	<10	<10	<10
ANTHRACENE	<10	<10	<10	<10	<10	<10	<10	<10
BENZO(a)ANTHRACENE	<10	<10	<10	<10	<10	<10	<10	<10
BENZO(a)PYRENE	<10	<10	<10	<10	<10	<10	<10	<10
BENZO(b)FLUORANTHENE	<10	<10	<10	<10	<10	<10	<10	<10
BENZO(ghi)PERYLENE	<10	<10	<10	<10	<10	<10	<10	<10
BENZO(k)FLUORANTHENE	<10	<10	<10	<10	<10	<10	<10	<10
BENZOIC ACID	<50	<50	<51	<50	<50	<50	<50	<50
BENZYL ALCOHOL	<10	<10	<10	<10	<10	<10	<10	<10
BIS(2-CHLOROETHOXY)METHANE	<10	<10	<10	<10	<10	<10	<10	<10
BIS(2-CHLOROETHYL)ETHER	<10	<10	<10	<10	<10	<10	<10	<10
BIS(2-CHLOROISOPROPYL)ETHER	<10	<10	<10	<10	<10	<10	<10	<10
BIS(2-ETHYLHEXYL)PHTHALATE	<10	<10	<10	46	<10	76 JA 49	130	<71 JA U 49
BUTYL BENZYL PHTHALATE	<10	<10	<10	<10	<10	<10	<10	<10
CHRYSENE	<10	<10	<10	<10	<10	<10	<10	<10
CYCLOHEXANOL, 4-CHLORO-, TRA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DI-n-BUTYL PHTHALATE	<10	<10	<10	<10	<10	<10	<10	<10
DI-n-OCTYL PHTHALATE	<10	<10	<10	<10	<10	<10	6 J	<10
DIBENZO(a,h)ANTHRACENE	<10	<10	<10	<10	<10	<10	<10	<10
DIBENZOFURAN	<10	<10	<10	<10	<10	<10	<10	<10
DIETHYL PHTHALATE	<10	<10	<10	<10	<10	<10	<10	<10
DIMETHYL PHTHALATE	<10	<10	<10	<10	<10	<10	<10	<10
ETHANE,1,1-OXYBIS(2-ETHOXY-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	15 Z1 J Z2
ETHANOL, 2-(2-ETHOXYETHOXY)-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
FLUORANTHENE	<10	<10	<10	<10	<10	<10	<10	<10
FLUORENE	<10	<10	<10	<10	<10	<10	<10	<10
HEPTANE, 4-PROPYL-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HEXACHLOROBENZENE	<10	<10	<10	<10	<10	<10	<10	<10
HEXACHLOROBUTADIENE	<10	<10	<10	<10	<10	<10	<10	<10
HEXACHLOROCYCLOPENTADIENE	<10	<10	<10	<10	<10	<10	<10	<10
HEXACHLOROETHANE	<10	<10	<10	<10	<10	<10	<10	<10
HEXANEDIOIC ACID, DIOCTYL ES	N/A	N/A	N/A	N/A	N/A	N/A	120 Z1 J	31 Z1 J
HEXANEDIOIC ACID, MONO(2-ETH	N/A	N/A	N/A	110 Z1 J	N/A	11 Z1 J	N/A	N/A
INDENO(1,2,3-cd)PYRENE	<10	<10	<10	<10	<10	<10	<10	<10
ISOPHORONE	<10	<10	<10	<10	<10	<10	<10	<10
N-NITROSO-DI-n-PROPYLAMINE	<10	<10	<10	<10	<10	<10	<10	<10
N-NITROSODIPHENYLAMINE	<10	<10	<10	<10	<10	<10	<10	<10
NAPHTHALENE	<10	<10	<10	<10	<10	<10	<10	<10
NITROBENZENE	<10	<10	<10	<10	<10	<10	<10	<10
PENTACHLOROPHENOL	<50	<50	51	<50	<50	<50	<50	<50
PHENANTHRENE	<10	<10	<10	<10	<10	<10	<10	<10
PHENOL	<10	<10	<10	<10	<10	<10	<10	<10
PYRENE	<10	<10	<10	<10	<10	<10	<10	<10
TETRADECYL IODIDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
p-BROMODIPHENYL ETHER	<10	<10	<10	<10	<10	<10	<10	<10

TABLE 4-7
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Semivolatile Organic Compounds

LOCATION: DATE SAMPLED:	P115089 21 Nov 1993	P115489 17 Nov 1993	P115589 22 Nov 1993	P115689 22 Nov 1993	P216289 21 Nov 1993	P216389 16 Nov 1993	P219489 16 Nov 1993	P219589 15 Nov 1993
1,2,4-TRICHLOROBENZENE	<10	<10	<10	<10	<10	<10	<10	<10
1,2-DICHLOROBENZENE	<10	<10	<10	<10	<10	<10	<10	<10
1,3-DICHLOROBENZENE	<10	<10	<10	<10	<10	<10	<10	<10
1,4-DICHLOROBENZENE	<10	<10	<10	<10	<10	<10	<10	<10
1,4-PENTADIENE, 3,3-DIMETHYL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4(1H,3H)-PYRIMIDINEDIONE,	N/A	N/A	N/A	N/A	N/A	210 Z1 J	N/A	N/A
2,4,5-TRICHLOROPHENOL	<50	<50	<50	<50	<50	<51	<52	<51
2,4,6-TRICHLOROPHENOL	<10	<10	<10	<10	<10	<10	<10	<10
2,4-DICHLOROPHENOL	<10	<10	<10	<10	<10	<10	<10	<10
2,4-DIMETHYLPHENOL	<10	<10	<10	<10	<10	<10	<10	<10
2,4-DINITROPHENOL	<50	<50	<50	<50	<50	51	<52	<51
2,4-DINITROTOLUENE	<10	<10	<10	<10	<10	<10	<10	<10
2,6-DINITROTOLUENE	<10	<10	<10	<10	<10	<10	<10	<10
2-CHLORONAPHTHALENE	<10	<10	<10	<10	<10	<10	<10	<10
2-CHLOROPHENOL	<10	<10	<10	<10	<10	<10	<10	<10
2-CYCLOHEXEN-1-ONE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2-METHYLNAPHTHALENE	<10	<10	<10	<10	<10	<10	<10	<10
2-METHYLPHENOL	<10	<10	<10	<10	<10	<10	<10	<10
2-NITROANILINE	<50	<50	<50	<50	<50	51	<52	<51
2-NITROPHENOL	<10	<10	<10	<10	<10	<10	<10	<10
3,3-DICHLOROBENZIDINE	<20	<20 R 41	<20	<20	<20	<20	21	<20
3-NITROANILINE	<50	<50 R 40	<50	<50	<50	51 R 41	52 R 41	51 R 41
4,6-DINITRO-2-METHYLPHENOL	<50	<50	<50	<50	<50	51	52	<51
4-CHLORO-3-METHYLPHENOL	<10	<10	<10	<10	<10	<10	<10	<10
4-CHLOROANILINE	<10	<10 R 40	<10	<10	<10	<10	<10 R 41	<10
4-CHLOROPHENYL PHENYL ETHER	<10	<10	<10	<10	<10	<10	<10	<10
4-METHYLPHENOL	<10	<10	<10	<10	<10	<10	<10	<10
4-NITROANILINE	<50	<50 R 41	<50	<50	<50	51 R 41	52 R 41	51 R 41
4-NITROPHENOL	<50	<50	<50	<50	<50	51	52	51
ACENAPHTHENE	<10	<10	<10	<10	<10	<10	<10	<10
ACENAPHTHYLENE	<10	<10	<10	<10	<10	<10	<10	<10
ANTHRACENE	<10	<10	<10	<10	<10	<10	<10	<10
BENZO(a)ANTHRACENE	<10	<10	<10	<10	<10	<10	<10	<10
BENZO(a)PYRENE	<10	<10	<10	<10	<10	<10	<10	<10
BENZO(b)FLUORANTHENE	<10	<10	<10	<10	<10	<10	<10	<10
BENZO(ghi)PERYLENE	<10	<10	<10	<10	<10	<10	<10	<10
BENZO(k)FLUORANTHENE	<10	<10	<10	<10	<10	<10	<10	<10
BENZOIC ACID	<50	<50	<50	<50	<50	51	<52	<51
BENZYL ALCOHOL	<10	<10	<10	<10	<10	<10	<10	<10
BIS(2-CHLOROETHOXY)METHANE	<10	<10	<10	<10	<10	<10	<10	<10
BIS(2-CHLOROETHYL)ETHER	<10	<10	<10	<10	<10	<10	<10	<10
BIS(2-CHLOROISOPROPYL)ETHER	<10	<10	<10	<10	<10	<10	<10	<10
BIS(2-ETHYLHEXYL)PHTHALATE	5 J	<10	<10	17	6 J	<10 JA 49	<10	<10
BUTYL BENZYL PHTHALATE	<10	<10	<10	<10	<10	<10	<10	<10
CHRYSENE	<10	<10	<10	<10	<10	<10	<10	<10
CYCLOHEXANOL, 4-CHLORO-, TRA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DI-n-BUTYL PHTHALATE	<10 JA 49	<10	<10	<10	<10	<10	<10	<10
DI-n-OCTYL PHTHALATE	<10	<10	<10	<10	<10	<10	<10	<10
DIBENZO(a,h)ANTHRACENE	<10	<10	<10	<10	<10	<10	<10	<10
DIBENZOFURAN	<10	<10	<10	<10	<10	<10	<10	<10
DIETHYL PHTHALATE	<10	<10	<10	<10	<10	<10	<10	<10
DIMETHYL PHTHALATE	<10	<10	<10	<10	<10	<10	<10	<10
ETHANE,1,1-OXYBIS(2-ETHOXY-	N/A	N/A	N/A	N/A	15 Z1 J	N/A	N/A	N/A
ETHANOL, 2-(2-ETHOXYETHOXY)-	N/A	N/A	12 Z1 J	12 Z1 J	N/A	N/A	N/A	N/A
FLUORANTHENE	<10	<10	<10	<10	<10	<10	<10	<10
FLUORENE	<10	<10	<10	<10	<10	<10	<10	<10
HEPTANE, 4-PROPYL-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HEXACHLOROBENZENE	<10	<10	<10	<10	<10	<10	<10	<10
HEXACHLOROBUTADIENE	<10	<10	<10	<10	<10	<10	<10	<10
HEXACHLOROCYCLOPENTADIENE	<10	<10	<10	<10	<10	<10	<10	<10
HEXACHLOROETHANE	<10	<10	<10	<10	<10	<10	<10	<10
HEXANEDIOIC ACID, DIOCTYL ES	N/A	N/A	N/A	21 Z1 J	N/A	N/A	N/A	N/A
HEXANEDIOIC ACID, MONO(2-ETH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
INDENO(1,2,3-cd)PYRENE	<10	<10	<10	<10	<10	<10	<10	<10
ISOPHORONE	<10	<10	<10	<10	<10	<10	<10	<10
N-NITROSO-DI-n-PROPYLAMINE	<10	<10	<10	<10	<10	<10	<10	<10
N-NITROSODIPHENYLAMINE	<10	<10	<10	<10	<10	<10	<10	<10
NAPHTHALENE	<10	<10	<10	<10	<10	<10	<10	<10
NITROBENZENE	<10	<10	<10	<10	<10	<10	<10	<10
PENTACHLOROPHENOL	<50	<50	<50	<50	<50	51	52	51
PHENANTHRENE	<10	<10	<10	<10	<10	<10	<10	<10
PHENOL	<10	<10	<10	<10	<10	<10	<10	<10
PYRENE	<10	<10	<10	<10	<10	<10	<10	<10
TETRADECYL IODIDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
p-BROMODIPHENYL ETHER	<10	<10	<10	<10	<10	<10	<10	<10

FINAL

TABLE 4-7
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Semivolatile Organic Compounds

LOCATION:	P313489	P313589	P415889	P415989	P416089	P416189	P416289	P416389
DATE SAMPLED:	16 Nov 1993	16 Nov 1993	16 Nov 1993	21 Nov 1993	23 Nov 1993	21 Nov 1993	22 Nov 1993	23 Nov 1993
1,2,4-TRICHLOROBENZENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
1,2-DICHLOROBENZENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
1,3-DICHLOROBENZENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
1,4-DICHLOROBENZENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
1,4-PENTADIENE, 3,3-DIMETHYL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4(1H,3H)-PYRIMIDINEDIONE,	N/A	N/A	N/A	18 Z1 J	N/A	N/A	N/A	N/A
2,4,5-TRICHLOROPHENOL	<50	<50	<50	<50	<50	<50	<50	<50 JA
2,4,6-TRICHLOROPHENOL	<10	<10	<10	<10	<10	<10	<10	<10 JA
2,4-DICHLOROPHENOL	<10	<10	<10	<10	<10	<10	<10	<10 JA
2,4-DIMETHYLPHENOL	<10	<10	<10	<10	<10	<10	<10	<10 JA
2,4-DINITROPHENOL	<50	<50	<50	<50	<50	<50	<50	<50 JA
2,4-DINITROTOLUENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
2,6-DINITROTOLUENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
2-CHLORONAPHTHALENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
2-CHLOROPHENOL	<10	<10	<10	<10	<10	<10	<10	<10 JA
2-CYCLOHEXEN-1-ONE	N/A	N/A	N/A	<10 Z1 JA	N/A	N/A	N/A	N/A
2-METHYLNAPHTHALENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
2-METHYLPHENOL	<10	<10	<10	<10	<10	<10	<10	<10 JA
2-NITROANILINE	<50	<50	<50 R 42	<50	<50	<50	<50	<50 JA
2-NITROPHENOL	<10	<10	<10	<10	<10	<10	<10	<10 JA
3,3-DICHLOROBENZIDINE	<20	<20	<20 R 42 41	<20	<20	<20	<20	<20 R
3-NITROANILINE	<50 R 41	<50 R 41	<50 R 42 40	<50 R 41	<50	<50	<50	<50 JA
4,6-DINITRO-2-METHYLPHENOL	<50	<50	<50	<50	<50	<50	<50	<50 JA
4-CHLORO-3-METHYLPHENOL	<10	<10	<10	<10	<10	<10	<10	<10 JA
4-CHLOROANILINE	<10	<10	<10 R 42 40	<10	<10	<10	<10	<10 JA
4-CHLOROPHENYL PHENYL ETHER	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
4-METHYLPHENOL	<10	<10	<10	<10	<10	<10	<10	<10 JA
4-NITROANILINE	<50 R 41	<50 R 41	<50 R 42 41	<50	<50	<50	<50	<50 JA
4-NITROPHENOL	<50	<50	<50	<50	<50	<50	<50	<50 JA
ACENAPHTHENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
ACENAPHTHYLENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
ANTHRACENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
BENZO(a)ANTHRACENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
BENZO(a)PYRENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
BENZO(b)FLUORANTHENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
BENZO(ghi)PERYLENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
BENZO(k)FLUORANTHENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
BENZOIC ACID	16 J 41	<50	<50	<50	<50	<50	<50	<50 JA
BENZYL ALCOHOL	<10	<10	<10	<10	<10	<10	<10	<10 JA
BIS(2-CHLOROETHOXY)METHANE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
BIS(2-CHLOROETHYL)ETHER	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
BIS(2-CHLOROISOPROPYL)ETHER	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
BIS(2-ETHYLHEXYL)PHTHALATE	<10	<10 JA 49	21 JA 42	<10	24 JA	7	<10	26 JA
BUTYL BENZYL PHTHALATE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
CHRYSENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
CYCLOHEXANOL, 4-CHLORO-, TRA	N/A	N/A	N/A	13 Z1 J	N/A	N/A	N/A	N/A
DI-n-BUTYL PHTHALATE	<10	<10	<10 R 42	<10	<10	<10 JA	<10	<10 JA
DI-n-OCTYL PHTHALATE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
DIBENZO(a,h)ANTHRACENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
DIBENZOFURAN	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
DIETHYL PHTHALATE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
DIMETHYL PHTHALATE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
ETHANE,1,1-OXYBIS(2-ETHOXY-	N/A	N/A	N/A	N/A	15 J	N/A	17 Z1 J	N/A
ETHANOL, 2-(2-ETHOXYETHOXY)-	12 J Z2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
FLUORANTHENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
FLUORENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
HEPTANE, 4-PROPYL-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HEXACHLOROBENZENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
HEXACHLOROBUTADIENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
HEXACHLOROCYCLOPENTADIENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
HEXACHLOROETHANE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
HEXANEDIOIC ACID, DIOCTYL ES	N/A	N/A	N/A	N/A	12 Z1	N/A	N/A	N/A
HEXANEDIOIC ACID, MONO(2-ETH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
INDENO(1,2,3-cd)PYRENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
ISOPHORONE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
N-NITROSO-DI-n-PROPYLAMINE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
N-NITROSODIPHENYLAMINE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
NAPHTHALENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
NITROBENZENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
PENTACHLOROPHENOL	<50	<50	<50	<50	<50	<50	<50	<50 JA
PHENANTHRENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
PHENOL	<10	<10	<10	<10	<10	<10	<10	<10 JA
PYRENE	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA
TETRADECYL IODIDE	N/A	N/A	N/A	6.8 Z J	N/A	N/A	N/A	N/A
p-BROMODIPHENYL ETHER	<10	<10	<10 R 42	<10	<10	<10	<10	<10 JA

TABLE 4-7
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Semivolatile Organic Compounds

LOCATION: DATE SAMPLED:	P416489 22 Nov 1993	P416589 21 Nov 1993	P416689 22 Nov 1993	P416889 23 Nov 1993	P416989 23 Nov 1993
1,2,4-TRICHLOROBENZENE	<10	<10	<10	<10	<10 JA 42
1,2-DICHLOROBENZENE	<10	<10	<10	<10	<10 JA 42
1,3-DICHLOROBENZENE	<10	<10	<10	<10	<10 JA 42
1,4-DICHLOROBENZENE	<10	<10	<10	<10	<10 JA 42
1,4-PENTADIENE, 3,3-DIMETHYL	N/A	N/A	N/A	N/A	N/A
2,4(1H,3H)-PYRIMIDINEDIONE,	N/A	N/A	N/A	N/A	N/A
2,4,5-TRICHLOROPHENOL	<50	<50	<50	<50	<50 R 42
2,4,6-TRICHLOROPHENOL	<10	<10	<10	<10	<10 R 42
2,4-DICHLOROPHENOL	<10	<10	<10	<10	<10 R 42
2,4-DIMETHYLPHENOL	<10	<10	<10	<10	<10 R 42
2,4-DINITROPHENOL	<50	<50	<50	<50	<50 R 42
2,4-DINITROTOLUENE	<10	<10	<10	<10	<10 JA 42
2,6-DINITROTOLUENE	<10	<10	<10	<10	<10 JA 42
2-CHLORONAPHTHALENE	<10	<10	<10	<10	<10 JA 42
2-CHLOROPHENOL	<10	<10	<10	<10	<10 R 42
2-CYCLOHEXEN-1-ONE	N/A	N/A	N/A	N/A	N/A
2-METHYLNAPHTHALENE	<10	<10	<10	<10	<10 JA 42
2-METHYLPHENOL	<10	<10	<10	<10	<10 R 42
2-NITROANILINE	<50	<50	<50	<50	<50 JA 42
2-NITROPHENOL	<10	<10	<10	<10	<10 R 42
3,3-DICHLOROBENZIDINE	<20	<20	<20	<20 R	<20 R 40
3-NITROANILINE	<50	<50	<50	<50	<50 JA 42
4,6-DINITRO-2-METHYLPHENOL	<50	<50	<50	<50	<50 R 42
4-CHLORO-3-METHYLPHENOL	<10	<10	<10	<10	<10 R 42
4-CHLOROANILINE	<10	<10	<10	<10	<10 JA 42
4-CHLOROPHENYL PHENYL ETHER	<10	<10	<10	<10	<10 JA 42
4-METHYLPHENOL	<10	<10	<10	<10	<10 R 42
4-NITROANILINE	<50	<50	<50	<50	<50 JA 42
4-NITROPHENOL	<50	<50	<50	<50	<50 R 42
ACENAPHTHENE	<10	<10	<10	<10	<10 JA 42
ACENAPHTHYLENE	<10	<10	<10	<10	<10 JA 42
ANTHRACENE	<10	<10	<10	<10	<10 JA 42
BENZO(a)ANTHRACENE	<10	<10	<10	<10	<10 JA 42
BENZO(a)PYRENE	<10	<10	<10	<10	<10 JA 42
BENZO(b)FLUORANTHENE	<10	<10	<10	<10	<10 JA 42
BENZO(ghi)PERYLENE	<10	<10	<10	<10	<10 JA 42
BENZO(k)FLUORANTHENE	<10	<10	<10	<10	<10 JA 42
BENZOIC ACID	<50	<50	<50	<50	<50 R 42
BENZYL ALCOHOL	<10	<10	<10	<10	<10 JA 42
BIS(2-CHLOROETHOXY)METHANE	<10	<10	<10	<10	<10 JA 42
BIS(2-CHLOROETHYL)ETHER	<10	<10	<10	<10	<10 JA 42
BIS(2-CHLOROISOPROPYL)ETHER	<10	<10	<10	<10	<10 JA 42
BIS(2-ETHYLHEXYL)PHTHALATE	<10	<10	<10	<10 JA	<10 JA 42
BUTYL BENZYL PHTHALATE	<10	<10	<10	<10	<10 JA 42
CHRYSENE	<10	<10	<10	<10	<10 JA 42
CYCLOHEXANOL, 4-CHLORO-, TRA	N/A	N/A	N/A	N/A	N/A
DI-n-BUTYL PHTHALATE	<10	<10 JA	<10	<10	<10 JA 42
DI-n-OCTYL PHTHALATE	<10	<10	<10	<10	<10 JA 42
DIBENZO(a,h)ANTHRACENE	<10	<10	<10	<10	<10 JA 42
DIBENZOFURAN	<10	<10	<10	<10	<10 JA 42
DIETHYL PHTHALATE	<10	<10	<10	<10	<10 JA 42
DIMETHYL PHTHALATE	<10	<10	<10	<10	<10 JA 42
ETHANE,1,1-OXYBIS(2-ETHOXY-	N/A	N/A	N/A	N/A	N/A
ETHANOL, 2-(2-ETHOXYETHOXY)-	11 Z1 J	N/A	13 Z1 J	N/A	N/A
FLUORANTHENE	<10	<10	<10	<10	<10 JA 42
FLUORENE	<10	<10	<10	<10	<10 JA 42
HEPTANE, 4-PROPYL-	N/A	11 Z1 J	N/A	N/A	N/A
HEXACHLOROBENZENE	<10	<10	<10	<10	<10 JA 42
HEXACHLOROBUTADIENE	<10	<10	<10	<10	<10 JA 42
HEXACHLOROCYCLOPENTADIENE	<10	<10	<10	<10	<10 JA 42
HEXACHLOROETHANE	<10	<10	<10	<10	<10 JA 42
HEXANEDIOIC ACID, DIOCTYL ES	N/A	N/A	N/A	N/A	N/A
HEXANEDIOIC ACID, MONO(2-ETH	N/A	N/A	N/A	N/A	N/A
INDENO(1,2,3-cd)PYRENE	<10	<10	<10	<10	<10 JA 42
ISOPHORONE	<10	<10	<10	<10	<10 JA 42
N-NITROSO-DI-n-PROPYLAMINE	<10	<10	<10	<10	<10 JA 42
N-NITROSODIPHENYLAMINE	<10	<10	<10	<10	<10 JA 42
NAPHTHALENE	<10	<10	<10	<10	<10 JA 42
NITROBENZENE	<10	<10	<10	<10	<10 JA 42
PENTACHLOROPHENOL	<50	<50	<50	<50	<50 R 42
PHENANTHRENE	<10	<10	<10	<10	<10 JA 42
PHENOL	<10	<10	<10	<10	<10 R 42
PYRENE	<10	<10	<10	<10	<10 JA 42
TETRADECYL IODIDE	N/A	N/A	N/A		N/A
p-BROMODIPHENYL ETHER	<10	<10	<10	<10	<10 JA 42

All results are reported in micrograms per liter
N/A = Not Analyzed
All units in ug/L
R = Data are rejected
J = Associated value is estimated quantity
A = Data are acceptable with qualifications
Z1 = Quest. ID, matrix interference of columns
Z2 = Validation was not requested or performed
< = Analyte not detected; associated value is the instrument detection limit
40 = Initial calibration criteria were not met
41 = Continued calibration criteria were not met
42 = Surrogates were outside criteria
49 = Method blank was contaminated

Table 4-8A
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells - Volatile Organic Compounds

LOCATION: SAMPLE DATE:	1986 17 Nov 1993	2186 18 Nov 1993	6186 19 Nov 1993	P114389 18 Nov 1993	P114489 18 Nov 1993	P114589 17 Nov 1993
1,1,1,2-TETRACHLOROETHANE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1,1-TRICHLOROETHANE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,1,2,2-TETRACHLOROETHANE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1,2-TRICHLOROETHANE	< 0.6 JA 10	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
1,1-DICHLOROETHANE	0.8 JA 10	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,1-DICHLOROETHENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1-DICHLOROPROPENE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,3-TRICHLOROBENZENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2,3-TRICHLOROPROPANE	< 0.4	< 0.4	< 0.4	< 0.4 R 41	< 0.4 R 41	< 0.4 R 41
1,2,4-TRICHLOROBENZENE	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
1,2-DIBROMOETHANE	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
1,2-DICHLOROBENZENE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2-DICHLOROETHANE	< 0.4 JA 10	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
1,2-DICHLOROPROPANE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,3-DICHLOROBENZENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3-DICHLOROPROPANE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,4-DICHLOROBENZENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2,2-DICHLOROPROPANE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-ISOPROPYLTOLUENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
ACETAMIDE, 2-FLUORO-	N/D	N/D	N/D	N/D	N/D	N/D
BENZENE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
BENZENE, 1,2,4,5-TETRAMETHYL	0.52	N/D	N/D	< 0.52 J Z	N/D	N/D
BENZENE, 1,2,4-TRIMETHYL	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
BENZENE, 1,3,5-TRIMETHYL-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
BROMOBENZENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
BROMOCHLOROMETHANE	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
BROMODICHLOROMETHANE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
BROMOFORM	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
BROMOMETHANE	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
CARBON TETRACHLORIDE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
CHLOROBENZENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
CHLOROETHANE	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
CHLOROFORM	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
CHLOROMETHANE	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
CHLOROTRIFLUOROETHENE	N/D	N/D	N/D	N/D	N/D	N/D
DIBROMOCHLOROMETHANE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
DIBROMOMETHANE	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
DICHLORODIFLUOROMETHANE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
DICHLOROTRIFLUOROETHANE	N/D	N/D	N/D	N/D	N/D	N/D
ETHANE, 1,2-DICHLORO-1,1,2-T	N/D	N/D	N/D	N/D	N/D	N/D
ETHYLBENZENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
HEXACHLOROBUTADIENE	< 0.2 JA 49	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
ISOPROPYLBENZENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
METHYLENE CHLORIDE	< 0.1 JA 10	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
NAPHTHALENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PROPANE, 1,2-DIBROMO-3-CHLORO-	< 0.4 R 40 41	< 0.4 R 40 41	< 0.4 R 40 41	< 0.4 R 40 41	< 0.4 R 40 41	< 0.4 R 40 41
STYRENE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TETRACHLOROETHENE	< 0.1	< 0.1	0.2 X JA	< 0.1	< 0.1	< 0.1
TOLUENE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TRICHLOROETHENE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TRICHLOROFLUOROMETHANE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
TRICHLOROTRIFLUOROETHANE	N/D	N/D	N/D	N/D	N/D	N/D
TRICHLOROMETHYLPROPENE	N/D	N/D	N/D	N/D	N/D	N/D
VINYL CHLORIDE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
cis-1,2-DICHLOROETHENE	0.6	< 0.2	< 0.2	< 0.1 JA	< 0.2	< 0.2
cis-1,3-DICHLOROPROPENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
m+p XYLENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
n-BUTYLBENZENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
n-PROPYLBENZENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
o-CHLOROTOLUENE	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
o-XYLENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
p-CHLOROTOLUENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
sec-BUTYLBENZENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
tert-BUTYLBENZENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
trans-1,2-DICHLOROETHENE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
trans-1,3-DICHLOROPROPENE	< 0.4 JA 10	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
UNKNOWN ALKANE	N/D	N/D	N/D	N/D	N/D	12 JZ
UNKNOWN (C6H14O)	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN CHLORINATED COMPOUND	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN	N/D	2.6 Z	N/D	18 JZ	0.1 JZ	N/D
UNKNOWN	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN (C4H8O2)	N/D	N/D	N/D	N/D	N/D	N/D

Table 4-8A
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells - Volatile Organic Compounds

LOCATION: SAMPLE DATE:	P114589 23 Nov 1993	P114789 22 Nov 1993	P114689 22 Nov 1993	P114989 23 Nov 1993	P115089 21 Nov 1993	P115489 17 Nov 1993
1,1,1,2-TETRACHLOROETHANE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
1,1,1-TRICHLOROETHANE	72 JA 1 42	4 JA 42	< 0.5	< 0.5	< 0.5	< 0.1
1,1,2,2-TETRACHLOROETHANE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
1,1,2-TRICHLOROETHANE	1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6 JA 10
1,1-DICHLOROETHANE	37 JA 1 42	3 JA 42	3 JA 42	< 0.5	< 0.5	< 0.1 JA 10
1,1-DICHLOROETHENE	180 JA 1 42	7 JA 42	0.5 JA 42	< 0.5	< 0.5	< 0.2
1,1-DICHLOROPROPENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1
1,2,3-TRICHLOROBENZENE	15	0.6 JA 42	< 0.5	< 0.5	< 0.5	< 0.2
1,2,3-TRICHLOROPROPANE	<0.5 R 40 41	< 0.5 R 40 41	< 0.5 R 40 41	< 0.5	< 0.5 R 40 41	< 0.4
1,2,4-TRICHLOROBENZENE	50 JA 1 42	1 JA 42	< 0.5	< 0.5	< 0.5	< 0.3
1,2-DIBROMOETHANE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.3
1,2-DICHLOROBENZENE	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1
1,2-DICHLOROETHANE	8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.4 JA 10
1,2-DICHLOROPROPANE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1
1,3-DICHLOROBENZENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
1,3-DICHLOROPROPANE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
1,4-DICHLOROBENZENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
2,2-DICHLOROPROPANE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1
4-ISOPROPYLTOLUENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
ACETAMIDE, 2-FLUORO-	N/D	N/D	N/D	N/D	N/D	N/D
BENZENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1
BENZENE, 1,2,4,5-TETRAMETHYL	N/D	N/D	N/D	N/D	N/D	N/D
BENZENE, 1,2,4-TRIMETHYL	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
BENZENE, 1,3,5-TRIMETHYL-	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
BROMOBENZENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
BROMOCHLOROMETHANE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
BROMODICHLOROMETHANE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
BROMOFORM	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.3
BROMOMETHANE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
CARBON TETRACHLORIDE	340 JA 1 42	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
CHLOROBENZENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
CHLOROETHANE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.4
CHLOROFORM	<0.5	1 JA 42	< 0.5	< 0.5	< 0.5	< 0.1
CHLOROMETHANE	<0.5 JA 10	< 0.5 JA 10	< 0.5 JA 10	< 0.5	< 0.5	< 0.4
CHLOROTRIFLUOROETHENE	6 Z	N/D	N/D	N/D	N/D	N/D
DIBROMOCHLOROMETHANE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
DIBROMOMETHANE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.3
DICHLORODIFLUOROMETHANE	<0.5 JA 10	< 0.5 JA 10	< 0.5 JA 10	< 0.5	< 0.5	< 0.2
DICHLOROTRIFLUOROETHANE	N/D	N/D	N/D	N/D	N/D	N/D
ETHANE, 1,2-DICHLORO-1,1,2-T	N/D	N/D	N/D	N/D	N/D	N/D
ETHYLBENZENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
HEXACHLOROBUTADIENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
ISOPROPYLBENZENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
METHYLENE CHLORIDE	0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1 JA 10
NAPHTHALENE	0.6 JA 49 10	< 0.5 JA 10	< 0.5 JA 10	< 0.5	< 0.5	< 0.2
PROPANE, 1,2-DIBROMO-3-CHLORO-	<0.5 R 40 41	< 0.5 R 40 41	< 0.5 R 40 41	< 0.5 R 40 41	< 0.5 R 40 41	< 0.4 R 40 41
STYRENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1
TETRACHLOROETHENE	76 JA 1 42	150 JA 42	78 JA 42	< 0.5	< 0.5	< 0.1
TOLUENE	0.5	0.5	< 0.5	< 0.5	< 0.5	< 0.1
TRICHLOROETHENE	39 JA 1 42	4 JA 42	42 JA 42	< 0.5	< 0.5	< 0.1
TRICHLOROFLUOROMETHANE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
TRICHLOROTRIFLUOROETHANE	N/D	0.7 Z	N/D	N/D	N/D	N/D
TRICHLOROMETHYLPROPENE	N/D	N/D	N/D	N/D	N/D	N/D
VINYL CHLORIDE	2 JA 10	0.7 JA 42 10	< 0.5 JA 10	< 0.5	< 0.5	< 0.2
cis-1,2-DICHLOROETHENE	24	12 JA 42	88 JA 42	< 0.5	< 0.5	< 0.2
cis-1,3-DICHLOROPROPENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
m+p XYLENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
n-BUTYLBENZENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
n-PROPYLBENZENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
o-CHLOROTOLUENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.3
o-XYLENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
p-CHLOROTOLUENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
sec-BUTYLBENZENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
tert-BUTYLBENZENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
trans-1,2-DICHLOROETHENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2
trans-1,3-DICHLOROPROPENE	<0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.4 JA 10
UNKNOWN ALKANE	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN (C8H14O)	2 Z	N/D	N/D	N/D	N/D	N/D
UNKNOWN CHLORINATED COMPOUND	0.9 Z	N/D	N/D	N/D	N/D	N/D
UNKNOWN	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN (C4H8O2)	N/D	N/D	N/D	N/D	N/D	N/D

Table 4-8A
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells - Volatile Organic Compounds

LOCATION: SAMPLE DATE:	P115589 22 Nov 1993	P115689 22 Nov 1993	P218289 21 Nov 1993	P218589 16 Nov 1993	P219189 18 Nov 1993	P219489 16 Nov 1993
1,1,1,2-TETRACHLOROETHANE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
1,1,1-TRICHLOROETHANE	250	7	< 0.5	< 0.1	12	< 0.1
1,1,2,2-TETRACHLOROETHANE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
1,1,2-TRICHLOROETHANE	7 JA 42	1	< 0.5	< 0.6	< 1	< 0.6
1,1-DICHLOROETHANE	770JA 1 42	1	1	< 0.1	58	< 0.1
1,1-DICHLOROETHENE	110JA 1 42	27	2	< 0.2	49	< 0.2
1,1-DICHLOROPROPENE	< 0.5	< 0.5	< 0.5	< 0.1	< 0.2	< 0.1
1,2,3-TRICHLOROBENZENE	2 JA 42	< 0.5	0.6	< 0.2	< 0.4	< 0.2
1,2,3-TRICHLOROPROPANE	< 0.5R 40 41	< 0.5	< 0.5	< 0.4	< 0.8 R 41	< 0.4
1,2,4-TRICHLOROBENZENE	4 JA 42	< 0.5	1	< 0.3	< 0.6	< 0.3
1,2-DIBROMOETHANE	< 0.5	< 0.5	< 0.5	< 0.3	< 0.6	< 0.3
1,2-DICHLOROBENZENE	< 0.5	< 0.5	< 0.5	< 0.1	< 0.2	< 0.1
1,2-DICHLOROETHANE	58	0.8	< 0.5	< 0.4	< 0.8	< 0.4
1,2-DICHLOROPROPANE	3 JA 42	< 0.5	< 0.5	< 0.1	< 0.2	< 0.1
1,3-DICHLOROBENZENE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
1,3-DICHLOROPROPANE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
1,4-DICHLOROBENZENE	< 0.5	< 0.5	1	< 0.2	< 0.4	< 0.2
2,2-DICHLOROPROPANE	< 0.5	< 0.5	< 0.5	< 0.1	< 0.2	< 0.1
4-ISOPROPYLTOLUENE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
ACETAMIDE, 2-FLUORO-	N/D	N/D	N/D	N/D	N/D	N/D
BENZENE	< 0.5	< 0.5	< 0.5	< 0.1	< 0.2	< 0.1
BENZENE, 1,2,4,5-TETRAMETHYL	N/D	N/D	N/D	N/D	N/D	N/D
BENZENE, 1,2,4-TRIMETHYL	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
BENZENE, 1,3,5-TRIMETHYL-	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
BROMOBENZENE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
BROMOCHLOROMETHANE	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5
BROMODICHLOROMETHANE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
BROMOFORM	< 0.5	< 0.5	< 0.5	< 0.3	< 0.6	< 0.3
BROMOMETHANE	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5
CARBON TETRACHLORIDE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
CHLOROBENZENE	< 0.5	< 0.5	3	< 0.2	< 0.4	< 0.2
CHLOROETHANE	2 JA 40 42	< 0.5	< 0.5	< 0.4	< 0.8	< 0.4
CHLOROFORM	3 JA 42	< 0.5	< 0.5	< 0.1	1	< 0.1
CHLOROMETHANE	< 0.5JA 10	< 0.5	< 0.5	< 0.4	< 0.8	< 0.4
CHLOROTRIFLUOROETHENE	N/D	N/D	N/D	N/D	N/D	N/D
DIBROMOCHLOROMETHANE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
DIBROMOMETHANE	< 0.5	< 0.5	< 0.5	< 0.3	< 0.6	< 0.3
DICHLORODIFLUOROMETHANE	< 0.5JA 10	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
DICHLOROTRIFLUOROETHANE	10 JZ	N/D	N/D	N/D	N/D	N/D
ETHANE, 1,2-DICHLORO-1,1,2-T	N/D	N/D	N/D	N/D	24 JZ	N/D
ETHYLBENZENE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
HEXACHLOROBUTADIENE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
ISOPROPYLBENZENE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
METHYLENE CHLORIDE	5 JA 42	< 0.5	< 0.5	< 0.1	< 0.2	< 0.1
NAPHTHALENE	< 0.5JA 10	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
PROPANE, 1,2-DIBROMO-3-CHLORO-	< 0.5R 40 41	< 0.5R 40 41	< 0.5R	< 0.4R 40 41	< 0.8 R 40 41	< 0.4 R 40 41
STYRENE	< 0.5	< 0.5	< 0.5	< 0.1	< 0.2	< 0.1
TETRACHLOROETHENE	430	7	42	< 0.1	< 0.2	0.1
TOLUENE	< 0.5	< 0.5	< 0.5	< 0.1	< 0.2	< 0.1
TRICHLOROETHENE	140	18	13	< 0.1	< 0.2	< 0.1
TRICHLOROFLUOROMETHANE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
TRICHLOROTRIFLUOROETHANE	N/D	N/D	N/D	N/D	N/D	N/D
TRICHLOROMETHYLPROPENE	1 Z	N/D	N/D	N/D	N/D	N/D
VINYL CHLORIDE	31	16	12	< 0.2	< 0.4	< 0.2
cis-1,2-DICHLOROETHENE	280	80	48	< 0.2	1	< 0.2
cis-1,3-DICHLOROPROPENE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
m+p XYLENE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
n-BUTYLBENZENE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
n-PROPYLBENZENE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
o-CHLOROTOLUENE	< 0.5	< 0.5	< 0.5	< 0.3	< 0.6	< 0.3
o-XYLENE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
p-CHLOROTOLUENE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
sec-BUTYLBENZENE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
tert-BUTYLBENZENE	< 0.5	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
trans-1,2-DICHLOROETHENE	2 JA 10	< 0.5	< 0.5	< 0.2	< 0.4	< 0.2
trans-1,3-DICHLOROPROPENE	< 0.5	< 0.5	< 0.5	< 0.4	< 0.8	< 0.4
UNKNOWN ALKANE	N/D	N/D	N/D	N/D	2.6 JZ	N/D
UNKNOWN (C6H14O)	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN CHLORINATED COMPOUND	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN	20 JZ	N/D	N/D	N/D	0.29 JZ	0.15 JZ
UNKNOWN	20 JZ	N/D	N/D	N/D	0.32 JZ	N/D
UNKNOWN (C4H8O2)	0.7 JZ	N/D	N/D	N/D	N/D	N/D

Table 4-8A
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells - Volatile Organic Compounds

LOCATION: SAMPLE DATE:	P219589 15 Nov 1993	P313489 16 Nov 1993	P313589 16 Nov 1993	P314089 23 Nov 1993	P314289 15 Nov 1993	P415889 18 Nov 1993
1,1,1,2-TETRACHLOROETHANE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
1,1,1-TRICHLOROETHANE	< 0.1	< 0.1	< 0.1	< 0.5	<0.1	<0.1
1,1,2,2-TETRACHLOROETHANE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
1,1,2-TRICHLOROETHANE	< 0.6	< 0.6	< 0.6	< 0.5	<0.6	<0.6 JA 10
1,1-DICHLOROETHANE	< 0.1	< 0.1	< 0.1	< 0.5	<0.1	<0.1 JA 10
1,1-DICHLOROETHENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
1,1-DICHLOROPROPENE	< 0.1	< 0.1	< 0.1	< 0.5	<0.1	<0.1
1,2,3-TRICHLOROBENZENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
1,2,3-TRICHLOROPROPANE	< 0.4R 41	< 0.4	< 0.4	< 0.5	<0.4	<0.4
1,2,4-TRICHLOROBENZENE	< 0.3	< 0.3	< 0.3	< 0.5	<0.3	<0.3
1,2-DIBROMOETHANE	< 0.3	< 0.3	< 0.3	< 0.5	<0.3	<0.3
1,2-DICHLOROBENZENE	< 0.1	< 0.1	< 0.1	< 0.5	<0.1	<0.1
1,2-DICHLOROETHANE	< 0.4	< 0.4	< 0.4	< 0.5	<0.4	<0.4 JA 10
1,2-DICHLOROPROPANE	< 0.1	< 0.1	< 0.1	< 0.5	<0.1	<0.1
1,3-DICHLOROBENZENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
1,3-DICHLOROPROPANE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
1,4-DICHLOROBENZENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
2,2-DICHLOROPROPANE	< 0.1	< 0.1	< 0.1	< 0.5	<0.1	<0.1
4-ISOPROPYLTOLUENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
ACETAMIDE, 2-FLUORO-	N/D	N/D	2.0JZ	N/D	N/D	N/D
BENZENE	< 0.1	< 0.1	< 0.1	< 0.5	<0.1	<0.1
BENZENE, 1,2,4,5-TETRAMETHYL	N/D	N/D	N/D	N/D	N/D	N/D
BENZENE, 1,2,4-TRIMETHYL	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
BENZENE, 1,3,5-TRIMETHYL-	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
BROMOBENZENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
BROMOCHLOROMETHANE	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5
BROMODICHLOROMETHANE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
BROMOFORM	< 0.3	< 0.3	< 0.3	< 0.5	<0.3	<0.3
BROMOMETHANE	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5
CARBON TETRACHLORIDE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
CHLOROBENZENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
CHLOROETHANE	< 0.4	< 0.4	< 0.4	< 0.5	<.4	<0.4
CHLOROFORM	0.1	< 0.1	2	< 0.5	<0.1	<0.1
CHLOROMETHANE	< 0.4	< 0.4	< 0.4	< 0.5	<0.4	<0.4
CHLOROTRIFLUOROETHENE	N/D	N/D	N/D	N/D	N/D	N/D
DIBROMOCHLOROMETHANE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
DIBROMOMETHANE	< 0.3	< 0.3	< 0.3	< 0.5	<0.3	<0.3
DICHLORODIFLUOROMETHANE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
DICHLOROTRIFLUOROETHANE	N/D	N/D	N/D	N/D	N/D	N/D
ETHANE, 1,2-DICHLORO-1,1,2-T	N/D	N/D	N/D	N/D	N/D	N/D
ETHYLBENZENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
HEXACHLOROBUTADIENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2 JA 10
ISOPROPYLBENZENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
METHYLENE CHLORIDE	< 0.1	< 0.1	< 0.1	< 0.5	<0.1	<0.1 JA 10
NAPHTHALENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
PROPANE, 1,2-DIBROMO-3-CHLORO-	< 0.4R 40 41	< 0.4R 40 41	< 0.4R 40 41	< 0.5R 40 41	<0.4 R 40 41	
STYRENE	< 0.1	< 0.1	< 0.1	< 0.5	<0.1	<0.1
TETRACHLOROETHENE	0.6	2	< 0.1	< 0.5	<0.1	<0.1
TOLUENE	< 0.1	< 0.1	< 0.1	< 0.5	<0.1	<0.1
TRICHLOROETHENE	0.1	0.2	< 0.1	< 0.5	<0.1	<0.1
TRICHLOROFLUOROMETHANE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
TRICHLOROTRIFLUOROETHANE	N/D	N/D	N/D	N/D	N/D	N/D
TRICHLOROMETHYLPROPENE	N/D	N/D	N/D	N/D	N/D	N/D
VINYL CHLORIDE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
cis-1,2-DICHLOROETHENE	< 0.2	0.4	< 0.2	< 0.5	<0.2	<0.2
cis-1,3-DICHLOROPROPENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
m+p XYLENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
n-BUTYLBENZENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
n-PROPYLBENZENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
o-CHLOROTOLUENE	< 0.3	< 0.3	< 0.3	< 0.5	<0.3	<0.3
o-XYLENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
p-CHLOROTOLUENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
sec-BUTYLBENZENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
tert-BUTYLBENZENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
trans-1,2-DICHLOROETHENE	< 0.2	< 0.2	< 0.2	< 0.5	<0.2	<0.2
trans-1,3-DICHLOROPROPENE	< 0.4	< 0.4	< 0.4	< 0.5	<0.4	<0.4 JA 10
UNKNOWN ALKANE	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN (C6H14O)	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN CHLORINATED COMPOUND	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN	N/D	N/D	0.1UZ	N/D	N/D	N/D
UNKNOWN	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN (C4H8O2)	N/D	N/D	N/D	N/D	N/D	N/D

Table 4-8A
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells - Volatile Organic Compounds

LOCATION:	P415989	P416089	P416189	P416289	P416389	P416489
SAMPLE DATE:	21 Nov 1993	23 Nov 1993	21 Nov 1993	22 Nov 1993	23 Nov 1993	22 Nov 1993
1,1,1,2-TETRACHLOROETHANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-TRICHLOROETHANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2,2-TETRACHLOROETHANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-TRICHLOROETHANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-DICHLOROETHANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-DICHLOROETHENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-DICHLOROPROPENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,3-TRICHLOROBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,3-TRICHLOROPROPANE	<0.5	<0.5	<0.5	<0.5	<0.5 R 40 41	<0.5 R 40 41
1,2,4-TRICHLOROBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-DIBROMOETHANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-DICHLOROBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-DICHLOROETHANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-DICHLOROPROPANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-DICHLOROBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-DICHLOROPROPANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-DICHLOROBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,2-DICHLOROPROPANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5 JA 10
4-ISOPROPYLTOLUENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ACETAMIDE, 2-FLUORO-	N/D	N/D	N/D	N/D	N/D	N/D
BENZENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BENZENE, 1,2,4,5-TETRAMETHYL	N/D	N/D	N/D	N/D	N/D	N/D
BENZENE, 1,2,4-TRIMETHYL	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BENZENE, 1,3,5-TRIMETHYL-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BROMOBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BROMOCHLOROMETHANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BROMODICHLOROMETHANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BROMOFORM	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BROMOMETHANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CARBON TETRACHLORIDE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CHLOROBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CHLOROETHANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CHLOROFORM	<0.5	<0.5	<0.5	17	<0.5	<0.5
CHLOROMETHANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CHLOROTRIFLUOROETHENE	N/D	N/D	N/D	N/D	N/D	N/D
DIBROMOCHLOROMETHANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
DIBROMOMETHANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
DICHLORODIFLUOROMETHANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
DICHLOROTRIFLUOROETHANE	N/D	N/D	N/D	N/D	N/D	N/D
ETHANE, 1,2-DICHLORO-1,1,2-T	N/D	N/D	N/D	N/D	N/D	N/D
ETHYLBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HEXACHLOROBUTADIENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ISOPROPYLBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
METHYLENE CHLORIDE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
NAPHTHALENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PROPANE, 1,2-DIBROMO-3-CHLORO-	<0.5 R 40 41	<0.5 R 40 41	<0.5 R 40 41	<0.5 R 40 41	<0.5 R 40 41	<0.5 R 40 41
STYRENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TETRACHLOROETHENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TOLUENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TRICHLOROETHENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TRICHLOROFLUOROMETHANE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TRICHLOROTRIFLUOROETHANE	N/D	N/D	N/D	N/D	N/D	N/D
TRICHLOROMETHYLPROPENE	N/D	N/D	N/D	N/D	N/D	N/D
VINYL CHLORIDE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1,2-DICHLOROETHENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5 JA 10
cis-1,3-DICHLOROPROPENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
m+p XYLENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
n-BUTYLBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
n-PROPYLBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-CHLOROTOLUENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-XYLENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
p-CHLOROTOLUENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
sec-BUTYLBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
tert-BUTYLBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-DICHLOROETHENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-DICHLOROPROPENE	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
UNKNOWN ALKANE	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN (C6H14O)	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN CHLORINATED COMPOUND	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN	N/D	N/D	N/D	N/D	N/D	N/D
UNKNOWN (C4H8O2)	N/D	N/D	N/D	N/D	N/D	N/D

Table 4-8A
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells - Volatile Organic Compounds

LOCATION: SAMPLE DATE:	P416589 21 Nov 93	P416689 22 Nov 93	P416789 23 Nov 93	P416889 23 Nov 93	P416989 23 Nov 93
1,1,1,2-TETRACHLOROETHANE	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-TRICHLOROETHANE	<0.5	<0.5	0.6	1 JA 42	<0.5
1,1,2,2-TETRACHLOROETHANE	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-TRICHLOROETHANE	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-DICHLOROETHANE	<0.5	<0.5	<0.5	1 JA 42	<0.5
1,1-DICHLOROETHENE	<0.5	1	0.6	5 JA 42	<0.5
1,1-DICHLOROPROPENE	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,3-TRICHLOROBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,3-TRICHLOROPROPANE	<0.5	<0.5	<0.5 R 40 41	<0.5 R 40 41	<0.5
1,2,4-TRICHLOROBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-DIBROMOETHANE	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-DICHLOROBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-DICHLOROETHANE	<0.5	<0.5	<0.5	1 JA 42	<0.5
1,2-DICHLOROPROPANE	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-DICHLOROBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-DICHLOROPROPANE	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-DICHLOROBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5
2,2-DICHLOROPROPANE	<0.5	<0.5	<0.5	<0.5	<0.5
4-ISOPROPYLTOLUENE	<0.5	<0.5	<0.5	<0.5	<0.5
ACETAMIDE, 2-FLUORO-	N/D	N/D	N/D	N/D	N/D
BENZENE	<0.5	<0.5	<0.5	<0.5	<0.5
BENZENE, 1,2,4,5-TETRAMETHYL	N/D	N/D	N/D	N/D	N/D
BENZENE, 1,2,4-TRIMETHYL	<0.5	<0.5	<0.5	<0.5	<0.5
BENZENE, 1,3,5-TRIMETHYL-	<0.5	<0.5	<0.5	<0.5	<0.5
BROMOBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5
BROMOCHLOROMETHANE	<0.5	<0.5	<0.5	<0.5	<0.5
BROMODICHLOROMETHANE	<0.5	<0.5	<0.5	<0.5	<0.5
BROMOFORM	<0.5	<0.5	<0.5	<0.5	<0.5
BROMOMETHANE	<0.5	<0.5	<0.5	<0.5	<0.5 JA 10
CARBON TETRACHLORIDE	<0.5	<0.5	<0.5	<0.5	<0.5
CHLOROBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5
CHLOROETHANE	<0.5	<0.5	<0.5	<0.5	<0.5
CHLOROFORM	<0.5	0.6	<0.5	0.9 JA42	<0.5
CHLOROMETHANE	<0.5	<0.5	<0.5	<0.5	<0.5
CHLOROTRIFLUOROETHENE	N/D	N/D	N/D	N/D	N/D
DIBROMOCHLOROMETHANE	<0.5	<0.5	<0.5	<0.5	<0.5
DIBROMOMETHANE	<0.5	<0.5	<0.5	<0.5	<0.5
DICHLORODIFLUOROMETHANE	<0.5	<0.5	<0.5	<0.5	<0.5
DICHLOROTRIFLUOROETHANE	N/D	N/D	0.8 Z	0.8 Z	N/D
ETHANE, 1,2-DICHLORO-1,1,2-T	N/D	N/D	N/D	N/D	N/D
ETHYLBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5
HEXACHLOROBUTADIENE	<0.5	<0.5	<0.5	<0.5	<0.5
ISOPROPYLBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5
METHYLENE CHLORIDE	<0.5	<0.5	<0.5	<0.5	<0.5
NAPHTHALENE	<0.5	<0.5	<0.5	<0.5	<0.5
PROPANE, 1,2-DIBROMO-3-CHLORO-	<0.5 R 40 41	<0.5 R 40 41	<0.5 R 40 41	<0.5 R 40 41	<0.5 R 40 41
STYRENE	<0.5	<0.5	<0.5	<0.5	<0.5
TETRACHLOROETHENE	0.7	3	7	35 JA 1 42	<0.5
TOLUENE	<0.5	<0.5	<0.5	<0.5	<0.5
TRICHLOROETHENE	<0.5	4	24	5 JA 42	<0.5
TRICHLOROFLUOROMETHANE	<0.5	<0.5	<0.5	<0.5	<0.5
TRICHLOROTRIFLUOROETHANE	N/D	N/D	20 Z	40 JZ	N/D
TRICHLOROMETHYLPROPENE	N/D	N/D	N/D	N/D	N/D
VINYL CHLORIDE	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1,2-DICHLOROETHENE	<0.5	0.7	6	9 JA 42	<0.5
cis-1,3-DICHLOROPROPENE	<0.5	<0.5	<0.5	<0.5	<0.5
m+p XYLENE	<0.5	<0.5	<0.5	<0.5	<0.5
n-BUTYLBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5
n-PROPYLBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5
o-CHLOROTOLUENE	<0.5	<0.5	<0.5	<0.5	<0.5
o-XYLENE	<0.5	<0.5	<0.5	<0.5	<0.5
p-CHLOROTOLUENE	<0.5	<0.5	<0.5	<0.5	<0.5
sec-BUTYLBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5
tert-BUTYLBENZENE	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-DICHLOROETHENE	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-DICHLOROPROPENE	<0.5	<0.5	<0.5	<0.5	<0.5
UNKNOWN ALKANE	N/D	N/D	N/D	N/D	N/D
UNKNOWN (C6H14O)	N/D	N/D	N/D	N/D	N/D
UNKNOWN CHLORINATED COMPOUND	N/D	N/D	N/D	N/D	N/D
UNKNOWN	N/D	N/D	N/D	N/D	N/D
UNKNOWN	N/D	N/D	N/D	N/D	N/D
UNKNOWN (C4H8O2)	N/D	N/D	N/D	N/D	N/D

Table 4-8A
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells - Volatile Organic Compounds

NOTES:

All results are reported in micrograms per liter
R = Data is rejected
Z = Validation was not requested or performed
< = Analyte not detected; associated value is instrument detection limit
N/D = Not Detected
X = Result by calculation – GRRASP
1 = Sample holding times were exceeded
10 = Laboratory control sample recovery criteria were not met
40 = Initial calibration criteria were not met
41 = Continued calibration criteria were not met
42 = Surrogates were outside criteria
J = Estimated value is less than the sample detection limit
A = Data are acceptable with qualifications

TABLE 4-8B
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Additional Wells - Volatile Organic Compounds

FINAL

LOCATION SAMPLE DATE	05093 18-Oct-93	05193 18-Oct-93	22293 05-Nov-93	2286 13-Oct-93	2386 29-Oct-93	2586 22-Oct-93	2786 25-Oct-93	3086 20-Oct-93
1,1,1-TRICHLOROETHANE	<0.1	<0.1	<0.1	<5	<5	<5	<5	<5
1,1,2-TRICHLOROETHANE	<0.6	<0.6	<0.6	<5	<5	<5	<5	<5
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NR	NR	NR	NR	NR	NR	NR	NR
1,1-DICHLOROETHANE	<0.1	<0.1	<0.1	<5	<5	<5	<5	<5
1,1-DICHLOROETHENE	<0.2	<0.2	<0.2	<5	<5	<5	<5	<5
1,2,3-TRICHLOROBENZENE	<0.2	<0.2	<0.2	NR	NR	NR	NR	NR
1,2,4-TRICHLOROBENZENE	<0.3	<0.3	<0.3	NR	NR	NR	NR	NR
1,2-DICHLOROBENZENE	<0.1	<0.1	<0.1	NR	NR	NR	NR	NR
1,2-DICHLOROETHANE	<0.4	<0.4	<0.4	<5	<5	<5	<5	<5
1,2-DICHLOROETHENE	NR	NR	NR	25.00	<5	<5	<5	<5
1,2-DICHLOROPROPANE	<0.1	<0.1	<0.1	<5	<5	<5	<5	<5
ACETONE	NR	NR	NR	<10	<10	<10	<10	<10
AZULENE	NR	NR	NR	NR	NR	NR	NR	NR
BENZENE	0.20	<0.1	<0.1	<5	<5	<5	<5	<5
BIS(2-ETHYLHEXYL)PHTHALATE	NR	NR	NR	NR	NR	NR	NR	NR
BROMACIL	NR	NR	NR	NR	NR	NR	NR	NR
CARBON TETRACHLORIDE	<0.2	<0.2	<0.2	210.00	<5	<5	<5	<5
CHLOROETHANE	<0.4	<0.4	<0.4	<10	<10	<10	<10	<10
CHLOROFORM	0.60	0.30	<0.1	61.00	<5	<5	<5	<5
CHLOROTRIFLUOROETHENE	NR	NR	NR	NR	NR	NR	NR	NR
cis-1,2-DICHLOROETHENE	0.50	<0.2	<0.2	NR	NR	NR	NR	NR
1,2-DICHLORO-1,1,2-T ETHANE	NR	NR	NR	NR	NR	NR	NR	NR
METHYLENE CHLORIDE	1.00	1.00	<0.1	<5	<5	9.00	<5	8.00
NAPHTHALENE	<0.2	<0.2	<0.2	NR	NR	NR	NR	NR
TETRACHLOROETHENE	0.50	14.00	<0.1	<5	<5	<5	<5	<5
TIC	1.20	NR	NR	NR	NR	NR	NR	NR
TOLUENE	0.30	<0.1	<0.1	<5	<5	<5	<5	<5
trans-1,2-DICHLOROETHENE	<0.2	<0.2	<0.2	NR	NR	NR	NR	NR
TRICHLOROETHENE	1.00	16.00	<0.1	220.00	<5	<5	<5	<5
VINYL CHLORIDE	<0.2	<0.2	<0.2	<10	<10	<10	<10	<10

All units in $\mu g/L$
NR = Not Reported
< = The compound was analyzed but was not detected. The associated value is the sample quantification limit.
TIC = tentatively identified compound
$\mu g/L$ = micrograms per liter

TABLE 4-8B
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Additional Wells - Volatile Organic Compounds

FINAL

LOCATION	37591	37791	37891	37991	3987	5187	5287	5687
SAMPLE DATE	23-Nov-93	04-Nov-93	23-Nov-93	23-Nov-93	26-Oct-93	04-Nov-93	03-Nov-93	15-Oct-93
1,1,1-TRICHLOROETHANE	<0.5	<0.1	<0.5	<0.5	<5	<5	<5	<5
1,1,2-TRICHLOROETHANE	<0.5	<0.6	<0.5	<0.5	<5	<5	<5	<5
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NR	NR	NR	NR	NR	NR	NR	45.00
1,1-DICHLOROETHANE	<0.5	<0.1	<0.5	<0.5	<5	<5	<5	10.00
1,1-DICHLOROETHENE	<0.5	<0.2	<0.5	<0.5	<5	<5	<5	6.00
1,2,3-TRICHLOROBENZENE	<0.5	<0.2	<0.5	<0.5	NR	NR	NR	NR
1,2,4-TRICHLOROBENZENE	<0.5	<0.3	<0.5	<0.5	NR	NR	NR	NR
1,2-DICHLOROBENZENE	<0.5	<0.1	<0.5	<0.5	NR	NR	NR	NR
1,2-DICHLOROETHANE	<0.5	<0.4	<0.5	<0.5	<5	<5	<5	<5
1,2-DICHLOROETHENE	NR	NR	NR	NR	<5	<5	<5	13.00
1,2-DICHLOROPROPANE	<0.5	<0.1	<0.5	<0.5	<5	<5	<5	<5
ACETONE	NR	NR	NR	NR	5.00	<10	<10	<10
AZULENE	NR	NR	NR	NR	NR	NR	NR	NR
BENZENE	<0.5	<0.1	<0.5	<0.5	<5	<5	<5	<5
BIS(2-ETHYLHEXYL)PHTHALATE	NR	NR	NR	NR	NR	NR	NR	NR
BROMACIL	NR	NR	NR	NR	NR	NR	NR	NR
CARBON TETRACHLORIDE	<0.5	<0.2	<0.5	<0.5	<5	<5	<5	<5
CHLOROETHANE	<0.5	<0.4	<0.5	<0.5	<10	<10	<10	<10
CHLOROFORM	<0.5	<0.1	0.90	<0.5	<5	<5	<5	5.00
CHLOROTRIFLUOROETHENE	NR	NR	NR	NR	NR	NR	NR	NR
cis-1,2-DICHLOROETHENE	<0.5	<0.2	<0.5	<0.5	NR	NR	NR	NR
1,2-DICHLORO-1,1,2-T ETHANE	NR	NR	NR	NR	NR	NR	NR	16.00
METHYLENE CHLORIDE	<0.5	<0.1	<0.5	<0.5	<5	<5	<5	<5
NAPHTHALENE	<0.5	<0.2	<0.5	<0.5	NR	NR	NR	NR
TETRACHLOROETHENE	<0.5	<0.1	<0.5	<0.5	<5	3.00	<5	3.00
TIC	NR	NR	0.60	NR	NR	NR	NR	NR
TOLUENE	<0.5	<0.1	<0.5	<0.5	<5	<5	<5	<5
trans-1,2-DICHLOROETHENE	<0.5	<0.2	<0.5	<0.5	NR	NR	NR	NR
TRICHLOROETHENE	<0.5	<0.1	<0.5	0.50	<5	<5	<5	61.00
VINYL CHLORIDE	<0.5	<0.2	<0.5	<0.5	<10	<10	<10	<10

All units in $\mu g/L$
NR = Not Reported
< = The compound was analyzed but was not detected. The associated value is the sample quantification limit.
TIC = tentatively identified compound
$\mu g/L$ = micrograms per liter

FINAL

TABLE 4-8B
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Additional Wells - Volatile Organic Compounds

LOCATION	78292	77492	B208089	B208189	P207389	P207589	P207689	P207789
SAMPLE DATE	29-Oct-93	28-Oct-93	26-Oct-93	26-Oct-93	12-Oct-93	13-Oct-93	18-Oct-93	14-Oct-93
1,1,1-TRICHLOROETHANE	<5	<5	<5	<5	<5	<5	<5	<5
1,1,2-TRICHLOROETHANE	<5	<5	<5	<5	<5	<5	<5	<5
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NR	NR	NR	NR	NR	NR	NR	NR
1,1-DICHLOROETHANE	<5	<5	<5	<5	<5	<5	<5	<5
1,1-DICHLOROETHENE	<5	<5	<5	<5	<5	<5	<5	<5
1,2,3-TRICHLOROBENZENE	NR	NR	NR	NR	NR	NR	NR	NR
1,2,4-TRICHLOROBENZENE	<10	<10	NR	NR	NR	NR	NR	NR
1,2-DICHLOROBENZENE	<10	<10	NR	NR	NR	NR	NR	NR
1,2-DICHLOROETHANE	<5	<5	<5	<5	<5	<5	<5	<5
1,2-DICHLOROETHENE	<5	<5	<5	<5	<5	<5	<5	<5
1,2-DICHLOROPROPANE	<5	<5	<5	<5	<5	<5	<5	<5
ACETONE	<10	<10	<10	<10	<10	<10	<10	<10
AZULENE	NR	NR	NR	NR	NR	NR	NR	6.60
BENZENE	<5	<5	<5	<5	<5	<5	<5	<5
BIS(2-ETHYLHEXYL)PHTHALATE	3.00	<10	NR	NR	NR	NR	NR	NR
BROMACIL	31.00	NR	NR	NR	NR	NR	NR	NR
CARBON TETRACHLORIDE	<5	2.00	<5	<5	<5	<5	<5	<5
CHLOROETHANE	<10	<10	<10	<10	<10	<10	<10	<10
CHLOROFORM	<5	<5	<5	<5	<5	<5	<5	<5
CHLOROTRIFLUOROETHENE	NR	NR	NR	NR	NR	NR	NR	NR
cis-1,2-DICHLOROETHENE	NR	NR	NR	NR	NR	NR	NR	NR
1,2-DICHLORO-1,1,2-T ETHANE	NR	NR	NR	NR	NR	NR	NR	NR
METHYLENE CHLORIDE	<5	<5	<5	<5	<5	<5	<5	1.00
NAPHTHALENE	<10	<10	NR	NR	NR	NR	NR	22.12
TETRACHLOROETHENE	<5	<5	<5	<5	<5	<5	<5	<5
TIC	21.00	NR	NR	NR	NR	NR	NR	NR
TOLUENE	<5	<5	<5	<5	<5	<5	<5	<5
trans-1,2-DICHLOROETHENE	NR	NR	NR	NR	NR	NR	NR	NR
TRICHLOROETHENE	<5	<5	<5	<5	<5	<5	<5	<5
VINYL CHLORIDE	<10	<10	<10	<10	<10	<10	<10	<10

All units in $\mu g/L$
NR = Not Reported
< = The compound was analyzed but was not detected. The associated value is the sample quantification limit.
TIC = tentatively identified compound
$\mu g/L$ = micrograms per liter

4-53

TABLE 4-8B
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Additional Wells - Volatile Organic Compounds

LOCATION SAMPLE DATE	P207889 13-Oct-93	P207989 14-Oct-93	P208889 26-Oct-93	P208989 22-Oct-93	P209089 21-Oct-93	P209389 19-Oct-93	P209489 15-Oct-93	P209589 19-Oct-93
1,1,1-TRICHLOROETHANE	<5	<5	<5	<5	<5	<5	<5	<5
1,1,2-TRICHLOROETHANE	<5	<5	<5	<5	<5	<5	<5	<5
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NR	NR	NR	NR	NR	NR	NR	NR
1,1-DICHLOROETHANE	<5	<5	<5	<5	<5	<5	<5	<5
1,1-DICHLOROETHENE	<5	<5	<5	<5	<5	49.00	<5	<5
1,2,3-TRICHLOROBENZENE	NR	NR	NR	NR	NR	NR	NR	NR
1,2,4-TRICHLOROBENZENE	NR	NR	NR	NR	NR	NR	NR	NR
1,2-DICHLOROBENZENE	NR	NR	NR	NR	NR	NR	NR	NR
1,2-DICHLOROETHANE	<5	<5	<5	<5	<5	<5	<5	<5
1,2-DICHLOROETHENE	<5	<5	<5	<5	<5	<5	11.00	<5
1,2-DICHLOROPROPANE	<5	<5	<5	<5	<5	<5	<5	<5
ACETONE	<10	<10	3.00	<10	<10	<10	<10	<10
AZULENE	NR	NR	NR	NR	NR	NR	NR	NR
BENZENE	<5	<5	<5	<5	<5	<5	<5	<5
BIS(2-ETHYLHEXYL)PHTHALATE	NR	NR	NR	NR	NR	NR	NR	NR
BROMACIL	NR	NR	NR	NR	NR	NR	NR	NR
CARBON TETRACHLORIDE	<5	<5	<5	<5	<5	17.00	46.00	<5
CHLOROETHANE	<10	<10	<10	<10	<10	<10	<10	<10
CHLOROFORM	<5	<5	<5	<5	<5	9.00	21.00	<5
CHLOROTRIFLUOROETHENE	NR	NR	NR	NR	NR	NR	NR	NR
cis-1,2-DICHLOROETHENE	NR	NR	NR	NR	NR	NR	NR	NR
1,2-DICHLORO-1,1,2-T ETHANE	NR	NR	NR	NR	NR	NR	8.10	NR
METHYLENE CHLORIDE	<5	<5	<5	4.00	<5	<5	<5	<5
NAPHTHALENE	NR	NR	NR	NR	NR	NR	NR	NR
TETRACHLOROETHENE	<5	<5	<5	1.00	<5	<5	4.00	<5
TIC	NR	NR	NR	NR	NR	NR	NR	NR
TOLUENE	<5	<5	<5	<5	<5	<5	<5	<5
trans-1,2-DICHLOROETHENE	NR	NR	NR	NR	NR	NR	NR	NR
TRICHLOROETHENE	<5	<5	<5	<5	<5	<5	70.00	<5
VINYL CHLORIDE	<10	<10	<10	<10	<10	<10	<10	<10

All units in µg/L
NR = Not Reported
< = The compound was analyzed but was not detected. The associated value is the sample quantification limit.
TIC = tentatively identified compound
µg/L = micrograms per liter

TABLE 4-8B
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Additional Wells - Volatile Organic Compounds

FINAL

LOCATION SAMPLE DATE	P209689 12-Oct-93	P209789 15-Oct-93	P209889 21-Oct-93	P210089 20-Oct-93	P210189 22-Oct-93	P215789 23-Nov-93
1,1,1-TRICHLOROETHANE	<5	<5	<5	<5	72.00	NR
1,1,2-TRICHLOROETHANE	<5	<5	<5	<5	<200	<12
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NR	NR	NR	NR	NR	NR
1,1-DICHLOROETHANE	<5	<5	<5	<5	<200	<12
1,1-DICHLOROETHENE	<5	<5	<5	<5	<200	96.00
1,2,3-TRICHLOROBENZENE	NR	NR	NR	NR	NR	15.00
1,2,4-TRICHLOROBENZENE	NR	NR	NR	NR	NR	<12
1,2-DICHLOROBENZENE	NR	NR	NR	NR	NR	<12
1,2-DICHLOROETHANE	<5	<5	<5	<5	<200	<12
1,2-DICHLOROETHENE	<5	<5	<5	<5	100.00	NR
1,2-DICHLOROPROPANE	<5	<5	<5	<5	<200	<12
ACETONE	<10	<10	<10	<10	<400	NR
AZULENE	NR	NR	NR	NR	NR	NR
BENZENE	<5	<5	<5	<5	<200	<12
BIS(2-ETHYLHEXYL)PHTHALATE	NR	NR	NR	NR	NR	NR
BROMACIL	NR	NR	NR	NR	NR	NR
CARBON TETRACHLORIDE	<5	<5	<5	<5	6600.00	<12
CHLOROETHANE	<10	<10	<10	<10	<400	<12
CHLOROFORM	<5	<5	<5	<5	320.00	<12
CHLOROTRIFLUOROETHENE	NR	NR	NR	NR	NR	NR
cis-1,2-DICHLOROETHENE	NR	NR	NR	NR	NR	210.00
1,2-DICHLORO-1,1,2-T ETHANE	NR	NR	NR	NR	NR	NR
METHYLENE CHLORIDE	<5	<5	<5	3.00	<200	<12
NAPHTHALENE	NR	NR	NR	NR	NR	25.00
TETRACHLOROETHENE	<5	3.00	<5	<5	<200	24.00
TIC	NR	NR	NR	NR	NR	NR
TOLUENE	<5	<5	<5	<5	<200	<12
trans-1,2-DICHLOROETHENE	NR	NR	NR	NR	NR	NR
TRICHLOROETHENE	<5	4.00	<5	<5	3800.00	1300.00
VINYL CHLORIDE	<10	<10	<10	<10	<400	<12

All units in μg/L
NR = Not Reported
< = The compound was analyzed but was not detected. The associated value is the sample quantification limit.
TIC = tentatively identified compound
μg/L = micrograms per liter

4-55

TABLE 4-9
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Total and Dissolved Radionuclides

FINAL

DISSOLVED RADIONUCLIDES												
LOCATION ID:	1986			2186			6186			P114389		
DATE SAMPLED:	17 Nov 1993			18 Nov 1993			19 Nov 1993			18 Nov 1993		
AMERICIUM-241	0.001	±	0.004 U	0.004	±	0.004	N/A		N/A	N/A		N/A
GROSS ALPHA	7.5	±	6.28387 UC	1.2	±	1.45804 UC	4.6	±	0.87	6.6	±	5.22266 UC
GROSS BETA	3.7	±	4.59789 UC	3.3	±	1.91002	2.9	±	1.8 J	5.7	±	4.00575 UC
PLUTONIUM-239/240	0.001	±	0.002 U	-0.001	±	0.003 U	N/A		N/A	N/A		N/A
RADIUM-226	0.5	±	0.253	N/A		N/A	N/A		N/A	0.32	±	0.197
STRONTIUM-89,90	0.0018	±	0.418 U	0.085	±	0.223 U	N/A		N/A	-0.0036	±	0.328 U
TOTAL RADIOCESIUM	0.27	±	0.39184 U	0.49	±	0.4784 U	N/A		N/A	0.23	±	0.29379 U
URANIUM-233,-234	2.4	±	0.65373	1	±	0.4	2.8	±	0.72 B	9.1	±	1.48026
URANIUM-235	0.075	±	0.11493 U	0.000	±	0.000 U	0.000	±	0.009 U	0.6	±	0.33136
URANIUM-238	2	±	0.58611	0.54	±	0.296	2.3	±	0.64 B	6.3	±	1.18794
TOTAL RADIONUCLIDES												
LOCATION ID:	1986			2186			6186			P114389		
DATE SAMPLED:	17 Nov 1993			18 Nov 1993			19 Nov 1993			18 Nov 1993		
AMERICIUM-241	0.0034	±	0.00251	0.0014	±	0.0034 U	N/A		N/A	N/A		N/A
GROSS ALPHA	45	±	16.73 C	1.4	±	1.02238	13	±	1.5	34	±	10.7364 C
GROSS BETA	21	±	9.31802 C	9.6	±	2.61346	3.9	±	1.9 J	20	±	6.17005 C
PLUTONIUM-239/240	0.0018	±	0.00262 U	0.00084	±	0.00165 U	N/A		N/A	N/A		N/A
RADIUM-226	1.1	±	0.369	N/A		N/A	0.35	±	0.17 J	1.6	±	0.418
RADIUM-228	N/A		N/A	N/A		N/A	N/A		N/A	N/A		N/A
STRONTIUM-89,90	0.069	±	0.442 U	-0.088	±	0.207 U	N/A		N/A	N/A		N/A
TOTAL RADIOCESIUM	1.80	±	0.46028	0.38	±	0.31786 U	N/A		N/A	N/A		N/A
TRITIUM	140	±	165.36 U	11	±	129.92 U	-28	±	220 U	110	±	161.03 U
URANIUM-233,-234	3.2	±	0.82557	0.79	±	0.3958	4.1	±	0.99 B	12	±	1.73023
URANIUM-235	0.37	±	0.27371	0.093	±	0.12963 U	0.046	±	0.092 U	0.27	±	0.21721
URANIUM-238	2.7	±	0.75415	0.61	±	0.3338	2	±	0.66 B	6.8	±	1.21964

N/A = Not Analyzed
All units in picocuries per liter.
U = Undetected, analyzed for but not detected
C = A smaller than normal aliquot was used because of heavy solids
B = Compound detected in the blank
J = Estimated concentration less than the sample detection limit
F = The full width at half of the maximum exceeded acceptable limits; however, data are acceptable

TABLE 4-9
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Total and Dissolved Radionuclides

FINAL

DISSOLVED RADIONUCLIDES												
LOCATION ID:	P114489			P114689			P114789			P114989		
DATE SAMPLED:	18 Nov 1993			23 Nov 1993			22 Nov 1993			23 Nov 1993		
AMERICIUM-241	N/A		N/A	0.005	±	0.004	0.001	±	0.002 U	N/A		N/A
GROSS ALPHA	-0.18	±	0.78088 U	0.53	±	2.1285 UC	0.98	±	2.29385 UC	1.2	±	1.33246 UC
GROSS BETA	1.2	±	1.2612 U	1.8	±	2.38052 UC	1.5	±	2.40564 UC	1.3	±	1.30378 U
PLUTONIUM-239/240	N/A		N/A	0.000	±	0.000 U	0.001	±	0.002 U	N/A		N/A
RADIUM-226	N/A		N/A	N/A		N/A	N/A		N/A	N/A		N/A
STRONTIUM-89,90	-0.13	±	0.334 U	0.02	±	0.189 U	-0.057	±	0.351 U	-0.19	±	0.346 U
TOTAL RADIOCESIUM	0.16	±	0.34848 U	0.27	±	0.44301 U	0.25	±	0.44122 U	0.3	±	0.36745 U
URANIUM-233,-234	0.65	±	0.38154	1.5	±	0.48267	0.62	±	0.33714	1.6	±	0.51943
URANIUM-235	0.14	±	0.18232 U	0.075	±	0.10362 U	0.036	±	0.08691 U	0.1	±	0.13268 U
URANIUM-238	1.4	±	0.54479	0.73	±	0.3324	0.7	±	0.34739	0.45	±	0.26533
TOTAL RADIONUCLIDES												
LOCATION ID:	P114489			P114689			P114789			P114889		
DATE SAMPLED:	18 Nov 1993			23 Nov 1993			22 Nov 1993			22 Nov 1993		
AMERICIUM-241	N/A		N/A	0.0023	±	0.00224	0.005	±	0.007 U	N/A		N/A
GROSS ALPHA	N/A		N/A	6.3	±	2.90456 C	15	±	5.2926 C	N/A		N/A
GROSS BETA	N/A		N/A	22	±	5.9516 C	38	±	8.73902 C	N/A		N/A
PLUTONIUM-239/240	N/A		N/A	0.0014	±	0.00201 U	0.002	±	0.002 U	N/A		N/A
RADIUM-226	N/A		N/A	0.41	±	0.199	0.39	±	0.208	N/A		N/A
RADIUM-228	N/A		N/A	N/A		N/A	N/A		N/A	N/A		N/A
STRONTIUM-89,90	N/A		N/A	-0.022	±	0.184 U	0.028	±	0.234 U	N/A		N/A
TOTAL RADIOCESIUM	N/A		N/A	0.6	±	0.3552	0.42	±	0.34846 U	N/A		N/A
TRITIUM	N/A		N/A	3300	±	371.45	77	±	137.86 U	94	±	138.53 U
URANIUM-233,-234	N/A		N/A	2.2	±	0.62213	2.3	±	0.62616	N/A		N/A
URANIUM-235	N/A		N/A	0.1	±	0.14143 U	0.37	±	0.2422	N/A		N/A
URANIUM-238	N/A		N/A	2	±	0.58465	1.8	±	0.55682	N/A		N/A

N/A = Not Analyzed
All units in picocuries per liter
U = Undetected, analyzed for but not detected
C = A smaller than normal aliquot was used because of heavy solids
B = Compound detected in the blank
J = Estimated concentration less than the sample detection limit
F = The full width at half of the maximum exceeded acceptable limits; however, data are acceptable

FINAL

TABLE 4-9
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Total and Dissolved Radionuclides

DISSOLVED RADIONUCLIDES				
LOCATION ID:	P114989	P115089	P115489	P115589
DATE SAMPLED:	23 Nov 1993	21 Nov 1993	17 Nov 1993	22 Nov 1993
AMERICIUM-241	N/A N/A	0.004 ± 0.004 J	0.004 ± 0.004 U	0.000 ± 0.002 U
GROSS ALPHA	N/A N/A	0.76 ± 0.49 J	0.19 ± 0.96113 U	4.4 ± 1.1
GROSS BETA	N/A N/A	−0.45 ± 1.9 U	1.8 ± 1.65633 U	0.77 ± 1.8 U
PLUTONIUM-239/240	N/A N/A	0.002 ± 0.002 U	0.001 ± 0.002 U	0.002 ± 0.004 U
RADIUM-226	N/A N/A	N/A N/A	N/A N/A	N/A N/A
STRONTIUM-89,90	N/A N/A	−0.16 ± 0.2 U	−0.059 ± 0.323 U	N/A N/A
TOTAL RADIOCESIUM	N/A N/A	−0.5 ± 0.45 U	0.390 ± 0.337 U	N/A N/A
URANIUM-233,-234	N/A N/A	0.95 ± 0.44 B	1.1 ± 0.46892	4 ± 0.7 B
URANIUM-235	N/A N/A	0.00 ± 0.01 U	0.18 ± 0.1931 U	0.068 ± 0.088 U
URANIUM-238	N/A N/A	0.38 ± 0.27 BJ	0.56 ± 0.33573	2.1 ± 0.48 B
TOTAL RADIONUCLIDES				
LOCATION ID:	P114989	P115089	P115489	P115589
DATE SAMPLED:	23 Nov 1993	21 Nov 1993	17 Nov 1993	22 Nov 1993
AMERICIUM-241	N/A N/A	0.003 ± 0.008 U	0.38 ± 0.06406 F	0.007 ± 0.01 U
GROSS ALPHA	110 ± 29.1668 C	25 ± 3.3	500 ± 170.088 C	120 ± 11
GROSS BETA	170 ± 39.6741 C	22 ± 3.9	600 ± 115.627 C	79 ± 11
PLUTONIUM-239/240	N/A N/A	0.001 ± 0.006 U	0.0082 ± 0.00647 U	−0.003 ± 0.028 U
RADIUM-226	0.049 ± 0.116 U	2.1 ± 0.17	6.7 ± 0.774	4.9 ± 0.2
RADIUM-228	N/A N/A	N/A N/A	7.50 ± 0.716	18 ± 6.7
STRONTIUM-89,90	0.16 ± 0.179 U	−0.26 ± 0.3 U	0.28 ± 0.459 U	N/A N/A
TOTAL RADIOCESIUM	0.5 ± 0.38333 U	1 ± 0.85 U	0.28 ± 0.3295 U	N/A N/A
TRITIUM	11 ± 131.26 U	−5.6 ± 220 U	53 ± 153.33 U	300 ± U
URANIUM-233,-234	62 ± 6.16258	1.8 ± 0.58 B	17 ± 2.244	6.6 ± 1.3 B
URANIUM-235	3.7 ± 0.87117	0.083 ± 0.12 U	0.6 ± 0.33753	0.04 ± 0.08 U
URANIUM-238	68 ± 6.73695	2.1 ± 0.63 B	17 ± 2.31179	4.1 ± 0.94 B

N/A = Not Analyzed
All units in picocuries per liter.
U = Undetected, analyzed for but not detected
C = A smaller than normal aliquot was used because of heavy solids
B = Compound detected in the blank
J = Estimated concentration less than the sample detection limit
F = The full width at half of the maximum exceeded acceptable limits; however, data are acceptable

TABLE 4-9
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Total and Dissolved Radionuclides

FINAL

DISSOLVED RADIONUCLIDES												
LOCATION ID:	P115689			P218289			P218389			P219189		
DATE SAMPLED:	22 Nov 1993			21 Nov 1993			16 Nov 1993			18 Nov 1993		
AMERICIUM-241	0.001	±	0.006 U	0.007	±	0.004 J	N/A		N/A	N/A		N/A
GROSS ALPHA	4.7	±	1.2	4.1	±	1.2	N/A		N/A	N/A		N/A
GROSS BETA	1.6	±	1.7 U	2	±	3.2 U	N/A		N/A	N/A		N/A
PLUTONIUM-239/240	0.003	±	0.004 J	0.001	±	0.002 U	N/A		N/A	N/A		N/A
RADIUM-226	N/A		N/A	N/A		N/A	N/A		N/A	N/A		N/A
STRONTIUM-89,90	N/A		N/A	-0.01	±	0.17 U	N/A		N/A	N/A		N/A
TOTAL RADIOCESIUM	N/A		N/A	0.23	±	0.38 U	N/A		N/A	N/A		N/A
URANIUM-233,-234	3	±	0.5 B	1.8	±	0.55 B	N/A		N/A	N/A		N/A
URANIUM-235	0.15	±	0.1 J	0.038	±	0.076 U	N/A		N/A	N/A		N/A
URANIUM-238	1.8	±	0.37 B	1	±	0.41 B	N/A		N/A	N/A		N/A
TOTAL RADIONUCLIDES												
LOCATION ID:	P115689			P218289			P218389			P219189		
DATE SAMPLED:	22 Nov 1993			21 Nov 1993			16 Nov 1993			18 Nov 1993		
AMERICIUM-241	0.041	±	0.024	0.007	±	0.008 BJ	N/A		N/A	N/A		N/A
GROSS ALPHA	84	±	9.5	11	±	1.8	N/A		N/A	N/A		N/A
GROSS BETA	58.00	±	10.00	9.8	±	1.4	N/A		N/A	N/A		N/A
PLUTONIUM-239/240	0.057	±	0.032	0.002	±	0.004 U	N/A		N/A	N/A		N/A
RADIUM-226	3.8	±	0.26	1.1	±	0.11 B	N/A		N/A	N/A		N/A
RADIUM-228	9	±	4.3	N/A		N/A	N/A		N/A	N/A		N/A
STRONTIUM-89,90	N/A		N/A	-0.1	±	0.24 U	N/A		N/A	N/A		N/A
TOTAL RADIOCESIUM	N/A		N/A	-0.35	±	0.61 U	N/A		N/A	N/A		N/A
TRITIUM	-25	±	220 U	290	±	230 U	52	±	150.46 U	580	±	193.95
URANIUM-233,-234	6.9	±	1.3 B	1.7	±	0.54 B	N/A		N/A	N/A		N/A
URANIUM-235	0.35	±	0.24 J	0.077	±	0.11 U	N/A		N/A	N/A		N/A
URANIUM-238	7.3	±	1.3 B	1.6	±	0.52 B	N/A		N/A	N/A		N/A

N/A = Not Analyzed
All units in picocuries per liter.
U = Undetected; analyzed for but not detected
C = A smaller than normal aliquot was used because of heavy solids
B = Compound detected in the blank
J = Estimated concentration less than the sample detection limit
F = The full width at half of the maximum exceeded acceptable limits; however, data are acceptable

TABLE 4-9
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Total and Dissolved Radionuclides

FINAL

DISSOLVED RADIONUCLIDES												
LOCATION ID:	P219489			P313489			P313589			P314089		
DATE SAMPLED:	16 Nov 1993			16 Nov 1993			16 Nov 1993			23 Nov 1993		
AMERICIUM-241	N/A		N/A	0.006	±	0.003	N/A		N/A	N/A		N/A
GROSS ALPHA	N/A		N/A	1.5	±	1.97742 UC	1.3	±	2.94362 UC	N/A		N/A
GROSS BETA	N/A		N/A	3.9	±	2.32732	4.2	±	3.81056 UC	N/A		N/A
PLUTONIUM-239/240	N/A		N/A	0.008	±	0.004	N/A		N/A	N/A		N/A
RADIUM-226	N/A		N/A	N/A		N/A	0.52	±	0.253	N/A		N/A
STRONTIUM-89,90	N/A		N/A	0.12	±	0.397 U	N/A		N/A	N/A		N/A
TOTAL RADIOCESIUM	N/A		N/A	0.61	±	0.40834 U	N/A		N/A	N/A		N/A
URANIUM-233,-234	N/A		N/A	1.8	±	0.6048	2.8	±	0.75073	N/A		N/A
URANIUM-235	N/A		N/A	0.13	±	0.16598 U	0.26	±	0.22366	N/A		N/A
URANIUM-238	N/A		N/A	0.97	±	0.4436	2.1	±	0.64589	N/A		N/A
TOTAL RADIONUCLIDES												
LOCATION ID:	P219489			P313489			P313589			P314089		
DATE SAMPLED:	16 Nov 1993			16 Nov 1993			16 Nov 1993			23 Nov 1993		
AMERICIUM-241	N/A		N/A	0.25	±	0.02622	N/A		N/A	N/A		N/A
GROSS ALPHA	N/A		N/A	22	±	8.24136 C	20	±	8.59747 C	N/A		N/A
GROSS BETA	N/A		N/A	20	±	5.19598 C	15	±	5.04932 C	N/A		N/A
PLUTONIUM-239/240	N/A		N/A	1.6	±	0.09831	N/A		N/A	N/A		N/A
RADIUM-226	N/A		N/A	1.2	±	0.314	0.26	±	0.217 U	N/A		N/A
RADIUM-228	N/A		N/A	N/A		N/A	N/A		N/A	N/A		N/A
STRONTIUM-89,90	N/A		N/A	-0.031	±	0.434 U	N/A		N/A	N/A		N/A
TOTAL RADIOCESIUM	N/A		N/A	0.59	±	0.39352 U	N/A		N/A	N/A		N/A
TRITIUM	270	±	179.93	52	±	152.48 U	290	±	181.78	54	±	136.09 U
URANIUM-233,-234	N/A		N/A	1.6	±	0.53268	3.1	±	0.83392	N/A		N/A
URANIUM-235	N/A		N/A	0.028	±	0.08606 U	0.026	±	0.10409 U	N/A		N/A
URANIUM-238	N/A		N/A	1.4	±	0.49421	2.6	±	0.74949	N/A		N/A

N/A = Not Analyzed
All units in picocuries per liter.
U = Undetected, analyzed for but not detected
C = A smaller than normal aliquot was used because of heavy solids
B = Compound detected in the blank
J = Estimated concentration less than the sample detection limit
F = The full width at half of the maximum exceeded acceptable limits; however, data are acceptable

TABLE 4-9
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Total and Dissolved Radionuclides

FINAL

DISSOLVED RADIONUCLIDES								
LOCATION ID:	P414189		P415889		P415989		P416089	
DATE SAMPLED:	16 Nov 1993		18 Nov 1993		21 Nov 1993		23 Nov 1993	
AMERICIUM-241	N/A	N/A	0.003	± 0.003 U	0.001	± 0.004 U	0.001	± 0.002 U
GROSS ALPHA	N/A	N/A	0.75	± 1.26075 UC	0.88	± 0.49 J	-0.54	± 0.80502 UC
GROSS BETA	N/A	N/A	1.4	± 1.31039 U	1	± 1.8 U	0.65	± 1.39811 U
PLUTONIUM-239/240	N/A	N/A	0.001	± 0.002 U	0.000	± 0.002 U	0.001	± 0.002 U
RADIUM-226	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
STRONTIUM-89,90	N/A	N/A	-0.14	± 0.345 U	-0.09	± 0.17 U	0.046	± 0.355 U
TOTAL RADIOCESIUM	N/A	N/A	0.46	± 0.32479 U	-0.39	± 0.38 U	0.47	± 0.31812 U
URANIUM-233,-234	N/A	N/A	0.35	± 0.25246	0.69	± 0.32 B	0.35	± 0.26459
URANIUM-235	N/A	N/A	0.042	± 0.08318 U	0.031	± 0.072 U	0.17	± 0.18652 U
URANIUM-238	N/A	N/A	0.2	± 0.18754	0.69	± 0.32 B	0.13	± 0.16107 U
TOTAL RADIONUCLIDES								
LOCATION ID:	P414189		P415889		P415989		P416089	
DATE SAMPLED:	16 Nov 1993		18 Nov 1993		21 Nov 1993		23 Nov 1993	
AMERICIUM-241	N/A	N/A	0.024	± 0.00863 F	0.006	± 0.006 J	0.0044	± 0.00342
GROSS ALPHA	N/A	N/A	31	± 12.8436 C	17	± 3.4	7.3	± 2.46509 C
GROSS BETA	N/A	N/A	50	± 9.1998 C	20	± 5.6	17	± 3.90207 C
PLUTONIUM-239/240	N/A	N/A	0.00	± 0.003 U	-0.004	± 0.007 U	0.0019	± 0.00335 U
RADIUM-226	N/A	N/A	1.8	± 0.373	2.3	± 0.18	0.1	± 0.096 U
RADIUM-228	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
STRONTIUM-89,90	N/A	N/A	-0.18	± 0.393 U	-0.7	± 0.46 U	0.1	± 0.194 U
TOTAL RADIOCESIUM	N/A	N/A	0.62	± 0.31476	-2.1	± 1.1 U	0.78	± 0.33465
TRITIUM	170	± 167.11 U	150	± 165.35 U	220	± 240 U	130	± 143.67 U
URANIUM-233,-234	N/A	N/A	0.72	± 0.37628	2.6	± 0.7 B	0.77	± 0.33971
URANIUM-235	N/A	N/A	0.00	± 0.15 U	0.11	± 0.14 U	0.061	± 0.10215 U
URANIUM-238	N/A	N/A	1.2	± 0.48283	3.3	± 0.81 B	0.68	± 0.31474

N/A = Not Analyzed
All units in picocuries per liter.
U = Undetected, analyzed for but not detected
C = A smaller than normal aliquot was used because of heavy solids
B = Compound detected in the blank
J = Estimated concentration less than the sample detection limit
F = The full width at half of the maximum exceeded acceptable limits; however, data are acceptable

FINAL

TABLE 4-9
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Total and Dissolved Radionuclides

DISSOLVED RADIONUCLIDES								
LOCATION ID:	P416189		P416289		P416389		P416489	
DATE SAMPLED:	21 Nov 1993		22 Nov 1993		23 Nov 1993		22 Nov 1993	
AMERICIUM-241	0.003	± 0.005 U	N/A	N/A	-0.001	± 0.004 U	N/A	N/A
GROSS ALPHA	1	± 1.54907 UC	N/A	N/A	0.58	± 1.38615 UC	1.1	± 2.35149 UC
GROSS BETA	0.19	± 1.73043 U	N/A	N/A	2.2	± 1.87379 U	1.2	± 2.69679 UC
PLUTONIUM-239/240	0.002	± 0.002 U	N/A	N/A	0.000	± 0.000 U	N/A	N/A
RADIUM-226	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
STRONTIUM-89,90	-0.091	± 0.232 U	N/A	N/A	0.027	± 0.318 U	-0.14	± 0.344 U
TOTAL RADIOCESIUM	0.44	± 0.35685 U	N/A	N/A	0.44	± 0.35776 U	0.29	± 0.32185 U
URANIUM-233,-234	0.78	± 0.38724	N/A	N/A	0.5	± 0.28623	2	± 0.637
URANIUM-235	0.039	± 0.09367 U	N/A	N/A	0.11	± 0.13141 U	0.084	± 0.1287 U
URANIUM-238	0.26	± 0.22879	N/A	N/A	0.22	± 0.18584	1.4	± 0.5166
TOTAL RADIONUCLIDES								
LOCATION ID:	P416189		P416289		P416389		P416489	
DATE SAMPLED:	21 Nov 1993		22 Nov 1993		23 Nov 1993		22 Nov 1993	
AMERICIUM-241	0.0094	± 0.00474	N/A	N/A	0.002	± 0.004 U	N/A	N/A
GROSS ALPHA	4.7	± 2.32182 C	N/A	N/A	9	± 3.98142 C	N/A	N/A
GROSS BETA	16	± 4.61711 C	N/A	N/A	31	± 7.63749 C	N/A	N/A
PLUTONIUM-239/240	0.00	± 0.000 U	N/A	N/A	0.003	± 0.003	N/A	N/A
RADIUM-226	N/A	N/A	N/A	N/A	0.19	± 0.134	N/A	N/A
RADIUM-228	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
STRONTIUM-89,90	-0.0053	± 0.206 U	N/A	N/A	-0.07	± 0.367 U	N/A	N/A
TOTAL RADIOCESIUM	0.14	± 0.36875 U	N/A	N/A	0.82	± 0.43019	N/A	N/A
TRITIUM	200	± 152.21 U	87	± 140.05 U	140	± 146.45 U	160	± 148.32 U
URANIUM-233,-234	0.58	± 0.314	N/A	N/A	1.6	± 0.50454	N/A	N/A
URANIUM-235	0.11	± 0.14 U	N/A	N/A	0.00	± 0.00 U	N/A	N/A
URANIUM-238	0.69	± 0.33406	N/A	N/A	1.2	± 0.44452	N/A	N/A

N/A = Not Analyzed
All units in picocuries per liter.
U = Undetected, analyzed for but not detected
C = A smaller than normal aliquot was used because of heavy solids
B = Compound detected in the blank
J = Estimated concentration less than the sample detection limit
F = The full width at half of the maximum exceeded acceptable limits; however, data are acceptable

TABLE 4-9
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Total and Dissolved Radionuclides

FINAL

DISSOLVED RADIONUCLIDES				
LOCATION ID: DATE SAMPLED:	P416589 21 Nov 1993	P416689 22 Nov 1993	P416789 23 Nov 1993	P416889 23 Nov 1993
AMERICIUM-241	0.005 ± 0.005 U	N/A N/A	N/A N/A	N/A N/A
GROSS ALPHA	1.8 ± 1.8188 UC	N/A N/A	N/A N/A	3.3 ± 2.825 UC
GROSS BETA	2.3 ± 2.89502 UC	N/A N/A	N/A N/A	2.3 ± 2.4985 UC
PLUTONIUM-239/240	0.001 ± 0.001 U	N/A N/A	N/A N/A	N/A N/A
RADIUM-226	N/A N/A	N/A N/A	N/A N/A	N/A N/A
STRONTIUM-89,90	0.046 ± 0.23 U	N/A N/A	N/A N/A	N/A N/A
TOTAL RADIOCESIUM	0.24 ± 0.36722 U	N/A N/A	N/A N/A	N/A N/A
URANIUM-233,-234	0.88 ± 0.39817	N/A N/A	N/A N/A	2.7 ± 0.8169
URANIUM-235	0.12 ± 0.14931 U	N/A N/A	N/A N/A	0.15 ± 0.20176 U
URANIUM-238	0.33 ± 0.24345	N/A N/A	N/A N/A	1.6 ± 0.6098
TOTAL RADIONUCLIDES				
LOCATION ID: DATE SAMPLED:	P416589 21 Nov 1993	P416689 22 Nov 1993	P416789 23 Nov 1993	P416889 23 Nov 1993
AMERICIUM-241	0.0073 ± 0.00425	N/A N/A	N/A N/A	N/A N/A
GROSS ALPHA	37 ± 10.907 C	N/A N/A	N/A N/A	12 ± 4.73683 C
GROSS BETA	83 ± 16.3906 C	N/A N/A	N/A N/A	39.00 ± 8.72 C
PLUTONIUM-239/240	0.0015 ± 0.00295 U	N/A N/A	N/A N/A	N/A ± N/A
RADIUM-226	0.26 ± 0.148	N/A N/A	N/A N/A	0.077 ± 0.13 U
RADIUM-228	N/A N/A	N/A N/A	N/A N/A	N/A N/A
STRONTIUM-89,90	-0.031 ± 0.2 U	N/A N/A	N/A N/A	N/A N/A
TOTAL RADIOCESIUM	0.24 ± 0.31362 U	N/A N/A	N/A N/A	N/A N/A
TRITIUM	380 ± 172.06	250 ± 159.03	16 ± 129.21 U	58 ± 134.82 U
URANIUM-233,-234	2.3 ± 0.67877	N/A N/A	N/A N/A	3.9 ± 0.80575
URANIUM-235	0.07 ± 0.13276 U	N/A N/A	N/A N/A	0.11 ± 0.12778
URANIUM-238	2.7 ± 0.73577	N/A N/A	N/A N/A	. 2 ± 0.56205

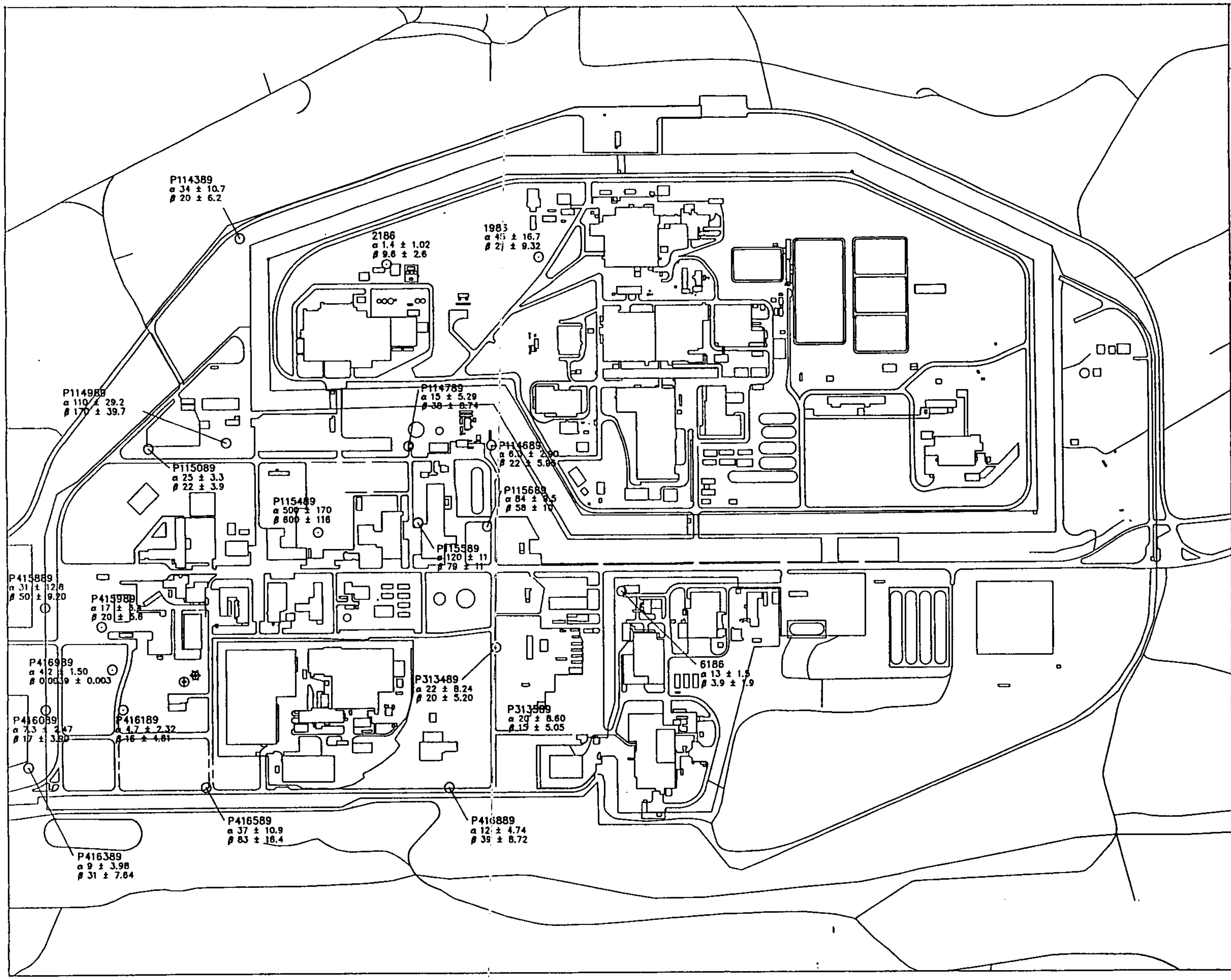
N/A = Not Analyzed
All units in picocuries per liter.
U = Undetected, analyzed for but not detected
C = A smaller than normal aliquot was used because of heavy solids
B = Compound detected in the blank
J = Estimated concentration less than the sample detection limit
F = The full width at half of the maximum exceeded acceptable limits; however, data are acceptable

FINAL

TABLE 4-9
Industrial Area IM/IRA/DD
Groundwater Analytical Results from Industrial Area Monitoring Wells
4th Quarter 1993, Special Purpose Wells – Total and Dissolved Radionuclides

DISSOLVED RADIONUCLIDES			
LOCATION ID:	P416989		
DATE SAMPLED:	23 Nov 1993		
AMERICIUM-241	0.006	±	0.004
GROSS ALPHA	1.2	±	1.54895 UC
GROSS BETA	3.3	±	1.59042
PLUTONIUM-239/240	0.001	±	0.002 U
RADIUM-226	N/A		N/A
STRONTIUM-89,90	-0.072	±	0.227 U
TOTAL RADIOCESIUM	0.34	±	0.34326 U
URANIUM-233,-234	26	±	2.71423
URANIUM-235	1.3	±	0.432
URANIUM-238	29	±	2.88942
TOTAL RADIONUCLIDES			
LOCATION ID:	P416989		
DATE SAMPLED:	23 Nov 1993		
AMERICIUM-241	0.0041	±	0.00462 U
GROSS ALPHA	0.0099	±	0.42423 U
GROSS BETA	4.2	±	1.49598
PLUTONIUM-239/240	0.0039	±	0.00315
RADIUM-226	N/A		N/A
RADIUM-228	N/A		N/A
STRONTIUM-89,90	-0.04	±	0.212 U
TOTAL RADIOCESIUM	0.24	±	0.32968 U
TRITIUM	-39	±	124.09 U
URANIUM-233,-234	0.43	±	0.29004
URANIUM-235	0.038	±	0.09182 U
URANIUM-238	0.34	±	0.25932

N/A = Not Analyzed
All units in picocuries per liter.
U = Undetected, analyzed for but not detected
C = A smaller than normal aliquot was used because of heavy solids
B = Compound detected in the blank
J = Estimated concentration less than the sample detection limit
F = The full width at half of the maximum exceeded acceptable limits; however, data are acceptable



U.S. Department of Energy

Rocky Flats Plant

- ⊙ Well
- α 15 Total Gross Alpha
- β 12 Total Gross Beta
- ▭ Building
- Fence
- Dirt Road
- Paved Road

All results in picocuries per liter.

Error values rounded to 3 significant figures.

200 100 0 200 400 feet

FIGURE 4–5
INDUSTRIAL AREA IM/IRA/DD

Groundwater Analytical Results
Fourth Quarter 1993 – Special Wells
Total Radionuclides

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402–0464

c:\rflats\sw\swfig4X.dwg 05H60300

(intentionally blank)

4.5.4 Additional Data

Existing data regarding UBC and footing drain sampling are also relevant to groundwater in the Industrial Area. The potential for UBC was identified at 31 buildings in the Industrial Area, according to the *Historical Release Report (HRR)* (EG&G 1992c). Soil and/or groundwater beneath the identified buildings may have become contaminated as a result of activities within the buildings. The results from aperiodic sampling of building sumps and foundation drains also indicate elevated metals, organic compounds, and radionuclides in water from certain sampling stations during 1992 and 1993. Footing drain sampling results are discussed in Section 7.0.

4.6 EVALUATION OF MONITORING PROGRAMS

Groundwater monitoring at RFP tends to be program-specific and regulation-driven. DOE has also established a plant protection mission for groundwater monitoring at RFP, under DOE Order 5400.1. The monitoring program and the wells in the monitoring network are subject to frequent review. The *Well Evaluation Report* (EG&G 1993a) identified the need for additional monitoring wells in the buffer zone, along the Woman Creek and Walnut Creek drainages.

For purposes of the IM/IRA, the locations of monitoring wells and frequency of sampling are generally adequate in the eastern Industrial Area. The OU4 and OU2 areas are monitored under the RCRA and CERCLA programs. Groundwater is sampled quarterly in these wells to meet technical and regulatory requirements. Groundwater monitoring coverage in the western and central Industrial Area is less extensive and may not be adequate to monitor some potential migration pathways. Additional wells, suitably placed with respect to potential sources of contamination, are needed to intercept and monitor predicted migration pathways. The need exists for monitoring wells downgradient of the buildings and IHSSs identified in Section 3.0.

4.7 PROPOSED ACTIONS FOR GROUNDWATER MONITORING

An ongoing quarterly and event-triggered monthly groundwater monitoring program is proposed for the Industrial Area to detect releases from D&D activities that may impact groundwater. Groundwater monitoring will be accomplished both by temporary well points installed very close to the D&D site and by newly installed monitoring wells and existing monitoring wells located further from the D&D site. Well points will constitute the first line of detection for any gross changes in groundwater quality, while the monitoring wells will be the means of establishing a more accurate picture of the extent and chemical character of any detected contamination. Routine monitoring will be conducted quarterly, with monthly monitoring triggered if elevated contaminant concentrations are detected (Section 9.5).

4.7.1 Existing Wells and Piezometers

To monitor changes in the groundwater quality in the vicinity of a D&D site, a set of monitoring wells has been identified from among the approximately 97 existing wells that are currently a part of the RCRA and CERCLA quarterly sampling program, and the 37 existing wells and piezometers in the Industrial Area that are not included in the current RCRA and CERCLA monitoring well networks. The identified existing wells will monitor groundwater quality in both a downgradient and upgradient direction relative to the D&D site.

Many of the existing wells and piezometers were recommended for incorporation into the routine groundwater monitoring program, for the purpose of the Industrial Area IM/IRA characterization, in the *Well Evaluation Report* (EG&G 1993a). The piezometers were installed in 1989 and are essentially located on a grid system. Several of these wells and piezometers are strategically placed, relative to potential source areas, and will fill data needs in the existing monitoring network. Others may be more useful for background or upgradient characterization for RFI/RIs.

Thirty-six wells and piezometers were sampled for this IM/IRA in late November and early December 1993. Selected results from this sampling were presented in Section 4.5.3. Because many of these wells or piezometers could aid in monitoring groundwater quality in the vicinity of a D&D site, it is proposed that 25 of the wells be retained in the quarterly groundwater sampling program to establish baseline chemical data (Figure 4-6 and Table 4-10). During D&D activities, an appropriate subset of these wells will be selected on a site-specific basis for routine verification monitoring (Section 9.5.1).

4.7.2 Additional Monitoring Wells

The central and western portions of the plant lack sufficient coverage by monitoring wells. Eleven additional monitoring wells are proposed in the alluvium of the upper hydrostratigraphic unit (Plate 4-1). The proposed locations were field checked for accessibility by a drill rig relative to locations of surface structures and overhead utilities. The locations have not yet been cleared for buried utilities, although appropriate utility maps were consulted. The locations and a brief justification for each are presented in Table 4-11 and are discussed in detail below.

Monitoring Wells A, M, and N. Monitoring wells are scarce in the vicinity of Buildings 371 and 374, where groundwater gradients are generally northeast. A northeast-trending groundwater divide apparently corresponds to the topographic divide between the main Walnut Creek drainage to the north and a northeast-trending tributary drainage, east of the 371/374 complex. Groundwater flows generally north and east from the divide. Wells are proposed in both directions to detect potential releases to groundwater from the 371/374 complex.

To the north of the 371/374 complex, three wells were installed in close proximity to one another. Two of those wells, installed in 1981, have since been abandoned. Bedrock Well 2186, screened from 33.84 to 66.04 feet below ground surface, is classified as Special Purpose (EG&G 1993d; EG&G 1993a). The well is monitored quarterly for water-level elevations and is proposed for incorporation into the IM/IRA monitoring network (Table 4-10).

Historical data from well 2186 indicate that radionuclides (gross alpha, gross beta, uranium-233, uranium-234, uranium-238, plutonium, and americium) have been detected. Three additional (new) wells are proposed in the 371/374 area, at locations A, M, and N in Plate 4-1.

Monitoring Well B. One additional well is proposed in the unnamed tributary to North Walnut Creek that drains the Protected Area between the 300 and 700 areas. The drainage currently contains two monitoring wells. Well 1986 is a shallow (12-foot) alluvial (colluvial) well located in the drainage bottom and is proposed for IM/IRA sampling (Table 4-10). Farther down in the drainage, Well 77492 is screened from 12 to 22 feet below top of casing (BTOC) in Rocky Flats Alluvium; it is a CERCLA characterization well that is sampled quarterly. Groundwater flow is north-northwest from the 558/565 area, and the additional well is proposed upgradient, closer to potential source areas. An alluvial well is proposed at Location B northeast of Building 565 (Plate 4-1) (50 feet northeast [N58° E] of the northwest corner of Building 565).

Monitoring Well C. One additional monitoring well is proposed to be installed southeast of the 371/374 complex at Location C (Plate 4-1). Groundwater in this vicinity flows generally northeast. This area currently does not contain any monitoring wells, and the closest monitoring wells, P114789 and P114689, are approximately 400 feet south and 600 feet southeast, respectively. An evaluation of analytical results from groundwater obtained from P114789 and P114689 from November 1993 indicated concentrations of

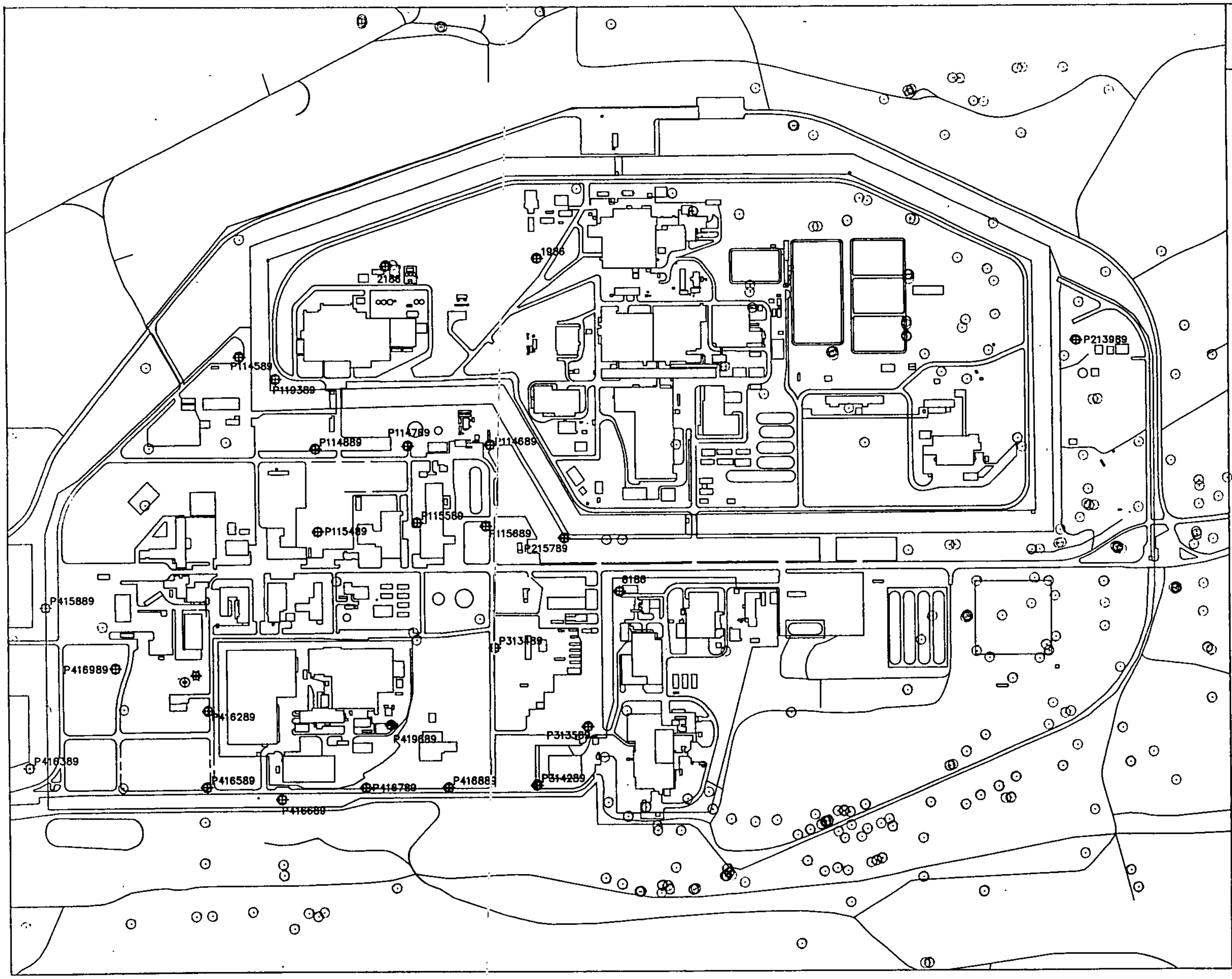


FIGURE 4-6
INDUSTRIAL AREA IM/IRA/DD

Existing Monitoring Wells Proposed for Industrial Area Quarterly Monitoring Program

EG&G ROCKY FLATS
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

c:\rflats\sw\swfig45.dwg 05H60300

(intentionally blank)

FINAL

TABLE 4-10
Industrial Area IM/IRA/DD
Existing Monitoring Wells Proposed for Sampling Under the Current Quarterly Monitoring Program

WELLS PROPOSED FOR IM/IRA SAMPLING PROGRAM:

	WELL NAME	STATE NORTH	STATE EAST	GENERAL AREA	WELL STATUS	CURRENT WELL CLASS	WELL PURPOSE	COMPLETION UNIT/LITHOLOGY
1	1986	750894	2083296	Plant North (PA)	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Kclst
2	2186	750855	2082501	Plant North (PA)	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Kss & Ksltclst
3	6186	749198	2083717	881 Hillside	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
4	P114689	749943	2083044	Plant Central	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
5	P114789	749940	2082610	Plant WC	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
6	P114889	749926	2082127	Plant WC	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
7	P115489	749507	2082135	Plant WC	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
8	P115589	749551	2082658	Plant WC	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
9	P115689	749532	2083019	Plant Central	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
10	P213989	750468	2086102	Plant NE	ACTIVE	RCRA	Industrial Area IM/IRA Monitoring	Qrf
11	P215789	749470	2083430	Plant Central	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
12	P314289	748216	2083280	Plant SC	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
13	P416589	748211	2081546	Plant SW	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
14	P416689	748147	2081941	Plant SW	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
15	P416789	748206	2082382	Plant SW/SC	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
16	P416889	748206	2082815	Plant SC	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
17	P419689	748522	2082513	Plant SC	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf & Kss
18	P114589	750396	2081731	Plant NW	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
19	P119389	750280	2081921	Plant West (PA)	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
20	P313489	748913	2083062	Plant SC	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
21	P313589	748510	2083547	Plant SC	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
22	P415889	749125	2080718	Plant WC	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
23	P416289	748598	2081555	Plant SW	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
24	P416389	748313	2080631	Plant SW	ACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Qrf
25	P416989	748780	2081034	Plant SW	INACTIVE	Special Purpose	Industrial Area IM/IRA Monitoring	Ksslt & Kslt

FINAL

TABLE 4-10
Industrial Area IM/IRA/DD
Existing Monitoring Wells Proposed for Sampling Under the Current Quarterly Monitoring Program

INDEX:

STATE NORTH = state plane coordinates, Northing.
STATE EAST = state plane coordinates, Easting.

GENERAL LOCATION:
- PA = Protected Area
- NW = northwest
- WC = west central
- SW = southwest
- SC = south central
- NE = northeast

SURFACE ELEV. = land surface elevation at well head, in feet above mean sea level.
TD = total depth of casing, in feet below ground surface.
TOP SCRN = top of screened interval, measured in feet below ground surface.
BOT SCRN = bottom of screened interval, in feet below ground surface.
TOP BEDROCK = top of bedrock, in feet below ground surface.

COMPLETION UNIT/LITHOLOGY = soil or rock type in which well is screened:
- Kss = Cretaceous sandstone
- Kclst = Cretaceous claystone
- Kcslt = Cretaceous clayey siltstone
- Kcss = Cretaceous clayey sandstone
- Ksclst = Cretaceous sandy claystone
- Kslt = Cretaceous siltstone
- Ksltclst = Cretaceous silty claystone
- Ksltss = Cretaceous silty sandstone
- Ksslt = Cretaceous sandy siltstone
- Qa = Quaternary alluvium
- Qc = Quaternary colluvium
- Qrf = Quaternary Rocky Flats Alluvium

WELL CLASSIFICATION:
- RCRA-C = RCRA characterization monitoring wells – information used to determine the rate and extent of migration of hazardous waste
- RCRA-S = monitoring wells used for RCRA statistical comparisons [40 CFR 265.93(b) and 265.94(a)(2)(ii)]
- CERCLA = monitoring wells specified in RFI/RI work plans. Industrial Area IM/IRA characterization wells will convert to "Plant Protection" wells.
- Special Purpose = wells not incorporated into RCRA, CERCLA, Boundary, or Background sampling programs

TABLE 4-11
Industrial Area IM/IRA/DD
Proposed New Monitoring Well Locations, Clearance Considerations, and Justification

FINAL

WELL	LOCATION	FIELD CHECK CONSIDERATIONS	UTILITY LINE CONSIDERATIONS	JUSTIFICATION
A	North of Building 371 (approximately 100' N of 371, 25'W of T371H)	Flat area, can easily maneuver drill rig between small buildings	RFP Site Utility Plans, Drawing #15501- Map not available; area is expected to be clear.	- Downgradient north of Building 371 - Documented UBC, IHSSs 151 and 212 - Only one well in area (bedrock well 2186)
B	Upper tributary drainage, NE of 565 (50' N58°E of NW corner of Building 565)	Gentle slope, area is clear	RFP Site Utility Plans, Drawing #15501-20 Area is apparently clear of underground utilities.	- Downgradient NNW of Buildings 559, 565 - 559 stores 19+ listed chemicals - Documented UBC in 559 - Only two wells (1986 & 77492, alluvial) in drainage.
C	SE of 371/374 complex, in upper tributary drainage	Not field checked		- Downgradient of well P114889 (elevated VOCs), near IHSS 156.1, 186, 188. - Currently, no wells exist in upper tributary drainage. - Downgradient wells P114789 and P114689 have shown elevated VOCs and radionuclides.
D	Between Buildings 559 and 707 (24' N40°E of SE corner of Bldg 559, N of Building 528)	Position drill rig between building and overhead pipes	RFP Site Utility Plans, Drawing #15501-20 - 9' E of copper utility pipe - 11' E of old process waste line - 17' NW of underground cable	- Downgradient east of Building 559, near IHSS 159 - Well P114689 ≈530 ft upgradient, contained elevated VOAs, Fall 1993

TABLE 4-11
Industrial Area IM/IRA/DD
Proposed New Monitoring Well Locations, Clearance Considerations, and Justification

WELL	LOCATION	FIELD CHECK CONSIDERATIONS	UTILITY LINE CONSIDERATIONS	JUSTIFICATION
E	North of Buildings 776 and 777 (145' due W of NW corner of 702)	Maneuver between small buildings. Area is flat	RFP Site Utility1 Plans, Drawing #15501-13 - 11' NE of underground structure - 14' W of 4' sanitary sewer - 11' S of 4' sanitary sewer - 24' N of old process waste line	- Downgradient north of 776\777 complex, in vicinity of IHSSs 118.1, 131,132, 144. - Potential under-building contamination - Nearest upgradient well is ≈1300 feet - ≈350 ft down/cross gradient P209389 & P209289 indicate elevated VOCs & radiochemicals
F	North of Building 771 (15' W of SW corner of T771A)	Position drill rig between small buildings. Area is flat	RFP Site Utility Plans, Drawing #15501-13 - 12' E of buried telephone line, 1'-8' deep - 19' N of 2400 volt electric cable - ≈44' N of old process waste line - ≈41' N of storm drain, vitrified clay pipe	- Downgradient north of Building 771 - 771 stores 16 listed chemicals - Documented UBC in 771 - near IHSSs 126.1 and 126.2, downgradient of IHSSs 118.1, 131, 132, and 144
H	Between Buildings 707 and 750 (54' S41°E of NW corner of Building 750)	Parking lot. Would require flush-mounted well completion	RFP Site Utility Plans, Drawing #15501-21 - 8' W of domestic cold water line - 9' SW of buried telephone cable - ≈17' N of storm sewer, vitrified clay pipe - 9' S42°E of storm drain	- Downgradient east of Building 707 - Downgradient of OPWL - General lack of well coverage - Elevated radionuclides at P218089, 260 feet SE

TABLE 4-11
Industrial Area IM/IRA/DD
Proposed New Monitoring Well Locations, Clearance Considerations, and Justification

WELL	LOCATION	FIELD CHECK CONSIDERATIONS	UTILITY LINE CONSIDERATIONS	JUSTIFICATION
J	Approximately 10' east of Building T886A	Clear, between buildings, and flat	RFP Site Utility Plans, Drawing #15501- Drawing not available. Area is expected to house fewer utilities than near well I. This well could substitute for I.	- Downgradient of Buildings 865 and 886 - P317989, 400 feet SW, has shown elevated radiochemicals
K	East of Building 444 (200' due E of the middle E corner of 444, ≈200' N of 664)	Gentle slope near RR tracks	RFP Site Utility Plans, Drawing #15501-41 - 55' E of railroad tracks - 19' E of 480 volt electric line - 13' W of underground cable, 2.5'-3' deep	- Downgradient east of Building 444 - Downgradient of IHSSs 136.2 and 207 - Only 2 downgradient-east wells (P419689, alluvial/bedrock; P313489, 700 feet east)
M	East of 371/374 complex	Level and clear, along fence line	RFP Site Utility Plans, Drawing #15501- Drawing not available	- Downgradient southeast of Building 371 - Documented UBC in 371 - Near IHSSs 151 and 212 - Only one well in area (bedrock Well 2186)
N	East of 371/374 complex	Level and clear, along fence line	RFP Site Utility Plans, Drawing #15501- Drawing not available	- Downgradient east of Building 371 - Documented UBC, IHSSs 151 and 212 - Only one well in area (bedrock Well 2186)

TABLE 4-11
Industrial Area IM/IRA/DD
Proposed New Monitoring Well Locations, Clearance Considerations, and Justification

Notes:

IHSS	=	Individual Hazardous Substance Site
RFP	=	Rocky Flats Plant
RR	=	railroad
UBC	=	under building contamination
VOCs	=	volatile organic compounds
#	=	number
'	=	feet
≈	=	approximately

volatile organics 1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, TCE, and PCE. In addition, monitoring well P114689 had detections of carbon tetrachloride and trichlorobenzene. Gross alpha and gross beta were detected as dissolved constituents in these monitoring wells ranging from 6.3 to 38 picocuries per gram (pCi/g).

Monitoring Well D. One additional monitoring well is proposed between Buildings 559 and 707 at Location D (Plate 4-1), downgradient east of Building 559 near IHSS 159. The nearest well, P114689, approximately 530 feet upgradient, is screened from 17.8 to 22.2 feet in Rocky Flats Alluvium. An evaluation of analytical results from groundwater obtained from P114689, during the November 1993 sampling round, contained 1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, CCl_4, PCE, TCE, and cis-1,2-dichloroethene. Monitoring Well D is proposed downgradient, to intercept a potential contaminant plume and to detect potential releases from Building 559.

Monitoring Well E. An alluvial well is proposed downgradient north of Buildings 776 and 777 (145 feet due west of the northwest corner of Building 702) at Location E (Plate 4-1), in the vicinity of IHSSs 118.1, 131, 132, and 144. Groundwater flow in the upper hydrostratigraphic unit is to the north, with a very slight westward component toward a paleotopographic drainage. The nearest upgradient wells, P215789 and P214089, are approximately 1,300 feet south-southwest. Currently, one set of paired wells (P209289 [alluvial, 12.7 feet BTOC] and P209389 [bedrock, 28.8 feet BTOC]), which is located approximately 200 feet north of Building 777, is sampled quarterly. Carbon tetrachloride, chloroform, and other organic compounds have been detected in both wells. Tritium and other radionuclides have been detected in small quantities in P209389. Proposed Well E will be located approximately 240 feet southwest (upgradient and lateral to or cross gradient) of the existing piezometers and is proposed to fill the data need and to detect potential releases from the 776/777 complex.

Monitoring Well F. One alluvial well is proposed downgradient north (Location F) of Building 771, in the vicinity of IHSSs 126.1 and 126.2, and downgradient of IHSSs 118.1, 131, 132, and 144. The potential for UBC has been reported at Building 771. Footing drain data reveal high levels of radionuclides. The nearest well, P219189, is cross gradient or lateral with respect to Building 771. Nearby well P209289 is an active Special Purpose well, currently measured monthly for water-level elevations, and has been dry for 12 of 50 sampling events. Proposed well Location F is farther removed from the seasonally unsaturated eastern hillslope and will provide detection of releases to groundwater from Building 771.

Monitoring Well H. One well is proposed downgradient east of Building 707, at location H (Plate 4-1). Groundwater flows to the east, with a slight southern component of flow. One abandoned well (5981) and one shallow piezometer (P218089, 7.4 feet BTOC) are located approximately 260 feet cross gradient southeast of the proposed location. P218089 is now classified as Special Purpose, for the investigation of the original process waste lines (OPWL), and is sampled quarterly. Elevated tritium concentrations were observed in groundwater from this well during the 1990 sampling. Uranium-233, uranium-234, and uranium-238 have also been detected. An additional alluvial well would provide better coverage of this area. Access for well installation will be limited by the numerous surface structures, overhead facilities, and underground utilities in the area.

Monitoring Well J. An alluvial well is proposed in the vicinity of Buildings 865 and 886 at Location J (Plate 4-1). Groundwater in the upper hydrostratigraphic unit flows to the northeast. The nearest upgradient well that is currently sampled is approximately 1,900 feet west-southwest. Well 6186, which is proposed for IM/IRA sampling, is approximately 850 feet upgradient west. Well P317989, 400 feet southwest, has shown elevated levels of gross alpha, gross beta, tritium, uranium-233, uranium-234, and uranium-238.

Monitoring Well K. An additional well is proposed downgradient of Building 444, where groundwater flow is dominantly eastward. An alluvial well at Location K will be downgradient of IHSSs 136.2 and 207 and Building 444. The borehole of the existing downgradient piezometer, P419689 (23.5 feet BTOC, screened in alluvium and bedrock), yielded soil samples that were elevated in gross alpha, gross beta, tritium, and radium in 1989. This piezometer has not been incorporated into the routine sampling program but is proposed for quarterly sampling under the IM/IRA. The other nearest downgradient piezometer (P313489) is 700 feet east of Building 445. Other wells and piezometers in the area are not in the eastward path of groundwater flow from Buildings 444 and 445.

4.7.3 Well Points

To detect releases to groundwater as early as possible, well points will be installed close to the D&D site. A well point consists of a slotted stainless-steel well screen attached to a steel point on the lower end and threaded pipe shank on the upper end. The well point is pushed or driven into the ground to a depth encountering groundwater. The number and locations of well points will be adequate to detect groundwater quality changes, will fill gaps in coverage by existing and new monitoring wells, and will be biased toward locations on the downgradient side of the D&D site. The well points will also be important for determining the groundwater elevation at D&D sites, as possibly affected by belowground structures. All well points will be installed according to standard operating procedure (SOP) GT.6, Revision 2 - "Monitoring Well and Piezometer Installation."

4.7.4 Analytical Suite and Duration of Groundwater Sampling

Baseline chemical data will be established for each well chosen to monitor a D&D site. For existing RCRA or CERCLA wells, baseline will consist of the quarterly sampling results for the three years immediately preceding D&D activities. For existing Special Purpose wells, newly installed wells, and well points, baseline will be established based on the quarterly sampling data collected to date, at the beginning of D&D activities.

The analytical suite for existing RCRA and CERCLA wells will remain the same as that used under the current quarterly sampling program. The analytical suite for existing Special Purpose wells, newly installed wells, and well points will initially consist of the comprehensive list of analytes (Appendix 3.1); these wells will be sampled on a quarterly basis for one year. Based on the results from the comprehensive suite, a location-specific analytical suite will be determined for each well, including constituents detected in the well and in any direct upgradient well and compounds of interest at the D&D site.

A reduced analytical suite may be especially important in the case of the well points because of the possibility of low groundwater yields when sampling. Sampling of new wells and well points should begin as soon as they are installed to establish a stable baseline. Sampling of wells and well points should continue for at least six months after D&D activities and at a particular site to allow for detection of a release to groundwater during the final stages of D&D work. The duration of post-D&D groundwater monitoring will be determined on a site-by-site basis depending on the local groundwater flow rates and the nature of the D&D activities at the site.

4.7.5 Exploratory Boreholes

Before constructing the proposed monitoring wells, exploratory boreholes and/or sampling may be performed using geoprobe/hydropunch technology. The technology will be used for determining borehole locations in areas of potential unsaturated conditions or whenever deemed necessary. These methods provide for a relatively inexpensive means of determining the occurrence and availability of groundwater. This technique will only be used in areas where existing wells cannot provide enough data to reasonably predict the presence of groundwater. The geoprobe/hydropunch screening of proposed monitoring well locations will be a useful procedure to help avoid installing wells in unsaturated alluvium.

4.7.6 Laramie-Fox Hills Aquifer

Monitoring of the Laramie-Fox Hills aquifer is not proposed as part of this IM/IRA/DD. Given the depth to the Laramie-Fox Hills aquifer, the low hydraulic conductivity of the overlying claystones, and the discontinuous nature of the Laramie sandstones, the Laramie-Fox Hills aquifer is not considered a potential pathway for contaminants that might be released during D&D activities.

4.8 SUMMARY OF FINDINGS

Sitewide, RFP has 455 active wells and piezometers in the groundwater monitoring network. Of these, 371 are monitoring wells and 84 are piezometers. Approximately 160 monitoring wells and piezometers are located in the Industrial Area.

Groundwater monitoring is performed under several different programs that are conceptually linked under the GPMP. The groundwater monitoring program is divided into six subprograms based on the purpose of the well and on regulatory requirements. The following is a list of the six subprograms:

- background monitoring to detect levels of chemical constituents at locations not affected by RFP activities; background monitoring was discontinued in September 1993;

- RCRA Regulatory Monitoring to monitor the upper hydrostratigraphic unit within and immediately adjacent to RCRA units;

- RCRA Characterization Monitoring to characterize and/or monitor hydrostratigraphic units other than the upper hydrostratigraphic unit at or near RCRA units;

- CERCLA Monitoring to characterize groundwater and the extent and movement of constituents as part of RI/FS activities;

- boundary monitoring to monitor groundwater movement and quality at the downgradient RFP boundaries; and

- Special Purpose Monitoring, which includes other wells that are used to characterize groundwater and hydrogeology.

Water-level measurements are obtained each quarter for all 455 active wells and piezometers and monthly in approximately 95 wells and piezometers. Groundwater samples are collected quarterly from all active wells designated for groundwater monitoring.

The standard analytical set for groundwater samples consists of the following:

- TCL VOCs;
- water quality parameters and anions;
- nitrate/nitrite;
- orthophosphate;
- gross alpha and gross beta;
- uranium, cesium, radium, and strontium (dissolved);
- TAL metals and cesium, lithium, molybdenum, strontium, and tin;
- tritium, plutonium, and americium (total); and
- cyanide.

SVOCs are analyzed only during the first quarter after installation of a new well. If SVOCs are detected during the initial analysis, they continue to be analyzed during subsequent sampling from that location.

The upper hydrostratigraphic unit may be a pathway for transport of constituents released from surface sources that may leach through permeable surficial soils to the water table by infiltrating precipitation.

The lower hydrostratigraphic unit is not considered a contaminant pathway for this IM/IRA because of the low hydraulic conductivity and discontinuous nature of the Laramie Formation sandstones. These two elements suggest there is no viable migration pathway for contaminants to reach ground surface from the lower hydrostratigraphic unit. Any needed studies of the lower hydrostratigraphic unit will be conducted during OU investigations.

The locations of monitoring wells and frequency of sampling are generally adequate in the eastern Industrial Area. Groundwater monitoring coverage in the western and central Industrial Area is limited and may not be adequate to monitor some potential contaminant pathways.

4.9 PROPOSED ACTIONS

The following list includes the actions proposed for the groundwater medium:

- Continue to sample 25 of the wells and piezometers proposed for inclusion in the IM/IRA monitoring network by the *Well Evaluation Report* (EG&G 1993a). The 25 wells proposed for continued monitoring for the IM/IRA are described in Table 4-10 and in Figure 4-6.

- Install 11 additional alluvial monitoring wells in the central and west areas of the Industrial Area. These wells are described in Table 4-11.

- For each D&D site, identify a set of upgradient and downgradient site wells necessary to detect potential releases from the site.

- At each D&D site, install well points close to the site to allow for early detection of any releases from the site.

- At the beginning of planning activities for a specific D&D action, establish baseline groundwater chemistry for each monitoring well or well point associated with that D&D action using the quarterly sampling results available for a maximum of up to three years preceding D&D startup.

- During D&D activities, compare each quarter's sampling results to baseline for each well or well point associated with that D&D site, and take appropriate action as outlined in Section 9.0.

- Drill exploratory boreholes using geoprobe/hydropunch technology to determine the presence of groundwater to aid in determining new well locations in areas of potential unsaturated alluvium, or as otherwise deemed necessary.

4.10 REFERENCES

EG&G Rocky Flats, Inc. 1993a (November 12). *Well Evaluation Report*. Draft Final.

EG&G Rocky Flats, Inc. 1993b (November). Barry Roberts of EG&G Rocky Flats. Personal communication with Susan Wyman and Theresa Jehn-Dellaport of Jacobs Engineering Group Inc.

EG&G Rocky Flats, Inc. 1993c. *Rocky Flats Plant Site Environmental Report, January through December 1992*.

EG&G Rocky Flats, Inc. 1993d (November). *Groundwater Protection and Monitoring Program Plan*.

EG&G Rocky Flats, Inc. 1993e (March). *Draft Final Technical Memorandum No. 8, Revised Phase II RFI/RI Work Plan (Bedrock), Rocky Flats Plant 903 Pad, Mound, and East Trenches (Operable Unit No. 2)*.

EG&G Rocky Flats, Inc. 1993f. *Annual RCRA Groundwater Monitoring Report for Regulated Units at Rocky Flats Plant*. (Issued annually.)

EG&G Rocky Flats, Inc. 1992a. *Operating Procedures, Vol. II, Groundwater*. No. 521000, SOPS-GW. Environmental Management Department.

EG&G Rocky Flats, Inc. 1992b (September 30). *Background Geochemical Characterization Report*. Final. Rocky Flats Plant, Golden, Colorado.

EG&G Rocky Flats, Inc. 1992c. *Historical Release Report*. The Rocky Flats Plant, Golden, Colorado. Environmental Restoration Program.

EG&G Rocky Flats, Inc. 1991. *Rocky Flats Plant Site Environmental Monitoring Report, January through December 1991*. RFP-ENV-91.

Freeze, R. Allan and John A. Cherry. 1979. *Groundwater*. Prentice-Hall, Inc. Englewood Cliffs, NJ.

Robson, S.G. 1983. Hydraulic Characteristic of the Principal Bedrock Aquifers in the Denver Basin, Colorado: *U.S. Geological Survey Hydrologic Investigations Atlas*. HA-659. Scale 1:500,000. Three sheets.

Robson, S.G., Andrew Wacinski, Stanley Zawistowski, and John C. Romero, 1981. Geologic Structure, Hydrology, and Water Quality of the Laramie-Fox Hills Aquifer in the Denver Basin, Colorado. *U.S. Geological Survey Hydrogeologic Investigations Atlas*. HA-650. Scale 1:500,000. Three sheets.

APPENDIX 4.1

INDUSTRIAL AREA IM/IRA/DD

WATER-LEVEL MEASUREMENTS IN INDUSTRIAL AREA MONITORING WELLS, SPRING AND FALL 1992

FINAL

APPENDIX 4.1
Industrial Area IM/IRA/DD
Water–Level Measurements in Industrial Area Monitoring Wells, Spring and Fall 1992

WELL	DTW	DATE	STATE NORTH	STATE EAST	COMPLETION UNIT/LITH	SURFACE ELEV.	TOP OF CASING	TD CSG	TOP SCRN	BOT SCRN	TOP OF BEDROCK	WLE
1386	4.38	02–APR–92	751857	2086051	Qc	5840.47	5842.59	9.50	3.09	9.50	9.00	5838.2
1486	11.69	02–APR–92	751856	2085338	Kss & Ksclst	5844.71	5846.71	55.36	39.42	55.36	11.00	5835.0
1586	5.62	02–APR–92	751852	2085312	Qc	5848.43	5850.63	14.44	4.09	14.44	12.50	5845.0
1686	5.46	02–APR–92	751747	2085260	Ksltss	5867.92	5869.55	45.06	39.06	45.06	7.00	5864.1
1786	5.37	02–APR–92	751740	2085242	Qc	5868.43	5869.57	13.98	3.73	13.98	12.50	5864.2
1886	8.83	02–APR–92	751522	2085831	Qc	5885.75	5887.97	7.50	3.74	7.50	8.00	5879.1
1986	2.34	02–APR–92	750894	2083296	Kclst	5943.08	5943.86	12.25	3.00	12.25	11.50	5941.5
2186	32.67	02–APR–92	750855	2082501	Kss & Ksltclst	6004.76	6005.96	67.25	35.00	67.24	15.00	5973.3
2286	7.12	02–APR–92	750718	2084411	Qrf	5978.77	5979.55	11.20	3.20	11.20	11.00	5972.4
2386	83.93	02–APR–92	750338	2084259	Kslt & Ksltclst	5982.46	5982.46	117.25	113.00	117.25	8.20	5898.5
2486	7.55	02–APR–92	750338	2084277	Qrf	5982.45	5983.56	7.45	2.95	7.45	7.20	5976.0
2586	30.43	03–APR–92	750412	2084831	Ksltclst & Kclst	5975.24	5977.14	82.00	59.90	82.00	8.00	5946.7
2686	9.96	03–APR–92	750411	2084841	Qrf	5975.42	5977.17	11.00	3.75	11.00	10.50	5967.2
2786	80.62	02–APR–92	750781	2085238	Kssits & Ksclst	5962.89	5963.88	133.00	128.50	133.00	11.00	5883.3
2986	7.43	02–APR–92	750599	2085687	Qrf	5959.58	5960.68	8.77	2.83	8.77	8.50	5953.3
3086	3.93	02–APR–92	751078	2084921	Kclst	5957.42	5958.39	14.93	2.48	14.93	2.50	5954.5
3186	DRY	02–APR–92	751051	2084764	Kss & Kslt	5964.98	5967.05	17.32	2.46	17.32	0.50	DRY
3286	59.09	02–APR–92	751050	2084743	Kss & Ksltss	5966.08	5967.92	125.50	114.90	125.50	1.00	5908.8
3386	5.97	02–APR–92	749950	2085003	Qrf	5951.40	5952.42	7.34	2.99	7.34	6.80	5946.5
4486	6.25	06–APR–92	749254	2082234	Qrf	6019.93	6021.96	26.25	3.23	26.25	25.50	6015.7
6186	8.88	06–APR–92	749198	2083717	Qrf	5999.47	6000.60	12.25	5.00	12.00	11.50	5991.7
0187	7.92	03–APR–92	748127	2083653	fill	5992.49	5994.08	12.08	3.38	11.83	11.80	5986.2
0587	43.62	01–APR–92	748081	2084849	Kss & Ksltss	5927.85	5929.99	51.50	42.00	51.25	11.00	5886.4
1287	5.58	03–APR–92	748581	2086066	Kcslt	5934.81	5936.30	10.24	4.91	10.01	3.50	5930.7
2187	10.24	02–APR–92	749969	2085799	Qc	5928.43	5929.69	10.56	3.26	10.41	8.00	5919.5
2287	80.46	02–APR–92	749924	2085822	Kss & Kslt	5931.18	5932.80	88.70	81.41	88.46	12.80	5852.3
3787	5.92	02–APR–92	750494	2085224	Qrf	5967.52	5968.99	9.00	3.50	8.77	8.00	5963.1
3887	8.47	03–APR–92	750396	2085094	Qrf	5972.15	5973.90	9.50	3.50	9.27	7.80	5965.4
3987	84.88	02–APR–92	751081	2085268	Ksslt & Kclst	5946.95	5948.42	117.39	109.99	117.14	3.50	5863.5
4387	7.9	01–APR–92	748030	2084788	Qc	5925.06	5926.41	12.50	3.50	12.25	12.00	5918.5
4487	3.92	03–APR–92	748306	2085435	Qc	5949.63	5951.10	3.70	1.50	3.50	3.20	5947.2
4587	91.15	03–APR–92	748313	2085451	Kss & Kslt & Kclst	5949.32	5950.91	101.30	89.50	97.05	4.00	5859.8
5687	7.08	02–APR–92	750638	2084423	Qrf	5978.39	5979.77	9.92	3.52	9.67	9.40	5972.7
1587	12.97	06–APR–92	749011	2086249	Qrf	5971.27	5972.79	22.53	5.80	22.06	21.90	5959.8
1687	86.46	06–APR–92	749130	2086249	Kslt	5969.49	5970.79	125.24	100.00	125.00	22.20	5884.3
1787	7.66	06–APR–92	749415	2086308	Qrf	5968.01	5969.56	25.75	3.50	25.50	25.00	5961.9
1887	129.46	06–APR–92	749404	2086339	Kss & Ksslt	5967.99	5969.49	133.70	127.00	133.45	25.20	5840.0
1987	6.94	06–APR–92	749623	2086171	Qrf	5968.44	5969.91	11.89	3.50	11.65	10.80	5963.0
2087	110.49	06–APR–92	749634	2086155	Ksltclst	5968.66	5970.14	116.36	107.26	116.11	11.80	5859.7
2387	11.25	06–APR–92	749404	2085910	Ksltss & Kclst	5972.79	5974.49	37.85	17.19	37.61	15.20	5963.2

APPENDIX 4.1
Industrial Area IM/IRA/DD
Water-Level Measurements in Industrial Area Monitoring Wells, Spring and Fall 1992

WELL	DTW	DATE	STATE NORTH	STATE EAST	COMPLETION UNIT/LITH	SURFACE ELEV.	TOP OF CASING	TD CSG	TOP SCRN	BOT SCRN	TOP OF BEDROCK	WLE
5087	DRY	03-APR-92	748123	2085334	Qc	5933.14	5934.78	13.70	3.50	13.50	12.50	DRY
5187	15.47	06-APR-92	748103	2083850	fill?	5963.27	5965.22	14.00	3.58	13.84	12.50	5949.8
5287	9.47	06-APR-92	748145	2084067	fill?	5967.85	5969.57	20.50	3.50	20.25	20.00	5960.1
5387	4.61	06-APR-92	747985	2083912	Qc	5959.99	5961.81	9.30	3.50	9.05	10.00	5957.2
5487	3.2	06-APR-92	747985	2084032	Qc	5955.85	5957.62	4.68	1.33	4.53	4.00	5954.4
5687	6.93	06-APR-92	750638	2084423	Qrf	5978.39	5979.77	9.92	3.52	9.67	9.40	5972.8
B208089	11.57	02-APR-92	751143	2085876	Qc	5935.40	5937.07	14.16	3.40	12.90	12.20	5925.5
B208189	4.02	02-APR-92	751138	2085885	Kclst	5935.40	5937.46	27.58	16.90	26.34	11.00	5933.4
B208289	17.14	02-APR-92	751739	2086289	Ksltclst & Kclst	5850.70	5852.95	16.16	5.95	15.42	0.20	5835.8
B208389	DRY	02-APR-92	751687	2085584	Ksclst & Kclst	5876.80	5878.66	9.05	3.37	7.80	0.20	DRY
B208489	DRY	02-APR-92	751683	2085636	Kclst	5876.30	5878.34	30.49	19.76	29.22	15.50	DRY
B208589	3.39	02-APR-92	751804	2085477	Qc	5856.50	5858.35	5.07	3.23	3.99	3.60	5855.0
B208689	19.14	02-APR-92	751728	2085250	Ksltclst	5867.60	5869.60	23.07	12.32	21.80	7.30	5850.5
B208789	3.83	02-APR-92	751755	2084450	Qc	5907.10	5909.03	12.32	2.88	10.93	8.40	5905.2
B210489	3.37	02-APR-92	751802	2085513	Qc	5856.40	5858.71	8.67	2.98	7.41	7.00	5855.3
P114389	7.56	01-APR-92	750337	2081246	Qrf	6033.40	6035.43	50.10	44.40	48.80	48.30	6027.9
P114489	9.23	01-APR-92	750337	2081246	Qrf	6033.40	6035.43	50.10	44.40	48.80	48.30	6026.2
P114589	3.58	01-APR-92	750396	2081731	Qrf	6024.10	6025.90	37.60	32.54	36.50	27.50	6022.3
P114689	8.28	01-APR-92	749943	2083044	Qrf	6004.00	6005.76	23.50	17.83	22.24	22.00	5997.5
P114789	7.35	01-APR-92	749940	2082610	Qrf	6010.70	6012.40	27.60	21.81	26.23	26.00	6005.1
P114889	6.62	01-APR-92	749926	2082127	Qrf	6016.60	6018.26	15.55	9.89	14.30	13.80	6011.6
P114989	14.48	01-APR-92	749959	2081661	Qrf	6029.80	6031.84	39.30	33.59	38.00	37.50	6017.4
P115089	10.74	01-APR-92	749930	2081258	Qrf	6038.10	6040.10	42.01	36.27	40.70	40.20	6029.4
P115489	8.47	01-APR-92	749507	2082135	Qrf	6023.40	6025.10	27.75	22.09	26.50	26.00	6016.6
P115589	4.35	01-APR-92	749551	2082658	Qrf	6014.10	6015.77	30.70	25.05	29.48	29.00	6011.4
P115689	7.53	01-APR-92	749532	2083019	Qrf	6006.90	6008.71	21.31	16.23	20.20	19.70	6001.2
P119389	5.38	02-APR-92	750280	2081921	Qrf	6011.70	6013.18	18.21	12.50	16.90	16.40	6007.8
P207389	6.48	03-APR-92	750195	2084468	Kss & Kclst	5981.02	5982.77	16.22	10.53	15.18	7.00	5976.3
P207489	6.3	03-APR-92	750197	2084481	Qrf	5980.71	5982.64	8.23	2.39	7.00	6.50	5976.3
P207589	25.77	03-APR-92	750395	2084843	Ksltclst	5974.06	5975.96	25.10	14.40	23.86	9.40	5950.2
P207689	6.85	02-APR-92	750398	2085318	Qrf	5966.32	5967.88	14.36	3.64	13.10	12.60	5961.0
P207789	29.36	02-APR-92	750392	2085343	Ksltclst	5965.88	5967.75	28.63	17.90	27.34	12.90	5938.4
P207889	4.25	02-APR-92	750671	2085343	Qrf	5962.82	5964.90	8.95	3.26	7.70	8.50	5960.7
P207989	21.03	02-APR-92	750671	2085330	Kclst	5963.09	5965.17	21.73	11.00	20.48	5.80	5944.1
P208889	86.13	02-APR-92	751086	2085249	Ksltclst	5947.30	5949.25	99.16	87.76	96.94	5.50	5863.1
P208989	12.16	02-APR-92	751044	2084839	Ksltss & Ksltclst	5962.53	5964.56	26.12	15.40	24.84	3.50	5952.4
P209089	28.03	03-APR-92	750566	2084910	Ksltclst	5972.16	5974.25	27.21	16.50	25.96	11.50	5946.2
P209189	10.18	02-APR-92	750762	2084309	Kss & Ksltclst	5980.66	5982.21	36.08	13.30	35.01	10.30	5972.0
P209289	13.73	02-APR-92	750863	2084139	Qrf	5981.59	5983.42	13.40	8.20	12.66	12.20	5969.7
P209389	17.15	02-APR-92	750864	2084130	Kss & Ksltss & Kcss	5981.47	5983.39	30.05	16.82	28.80	13.80	5966.2

APPENDIX 4.1

FINAL

Industrial Area IM/IRA/DD

Water–Level Measurements in Industrial Area Monitoring Wells, Spring and Fall 1992

WELL	DTW	DATE	STATE NORTH	STATE EAST	COMPLETION UNIT/LITH	SURFACE ELEV.	TOP OF CASING	TD CSG	TOP SCRN	BOT SCRN	TOP OF BEDROCK	WLE
P209489	26.5	02–APR–92	750991	2084634	Kss & Ksltss	5977.98	5980.10	36.25	15.48	35.00	9.00	5953.6
P209589	18.36	02–APR–92	751071	2085286	Ksltclst & Ksclst	5948.17	5950.04	19.77	9.07	18.52	4.10	5931.7
P209689	28.45	02–APR–92	750533	2085514	Ksltclst	5962.63	5964.43	27.93	17.20	26.67	12.20	5936.0
P209789	4.7	02–APR–92	750579	2085481	Qrf	5962.82	5964.94	13.75	3.00	12.50	12.00	5960.2
P209889	4.49	02–APR–92	751194	2084984	Ksltclst	5940.28	5942.40	19.63	8.89	18.33	3.90	5937.9
P209989	10.29	02–APR–92	751565	2084649	Qc	5898.10	5900.40	9.58	3.81	8.18	7.70	5890.1
P210089	19.21	02–APR–92	751564	2084639	Ksltclst	5898.40	5900.40	22.93	12.20	21.50	7.20	5881.2
P213689	8.54	01–APR–92	749460	2083736	Qrf	5994.30	5996.04	14.80	9.08	13.50	13.00	5987.5
P213889	DRY	02–APR–92	750466	2086109	Kss & Kcss	5954.10	5955.94	22.03	11.30	20.83	8.00	DRY
P213989	DRY	02–APR–92	750468	2086102	Qrf	5954.30	5956.38	7.20	3.29	6.92	6.70	DRY
P215789	13.87	01–APR–92	749470	2083430	Qrf	6002.00	6003.66	19.59	14.53	18.50	18.00	5989.8
P218089	5.16	02–APR–92	749941	2084020	Qrf	5985.80	5987.55	8.69	3.00	7.43	6.00	5982.4
P218389	8.83	02–APR–92	750831	2085648	Qrf	5956.20	5958.45	13.77	8.06	12.50	12.00	5949.6
P219189	9.77	02–APR–92	751222	2084010	Qc	5941.20	5943.15	12.77	7.08	11.50	11.00	5933.4
P219489	14.48	02–APR–92	750415	2085651	Qrf	5959.50	5961.15	24.20	18.48	22.90	22.50	5946.7
P219589	23.94	02–APR–92	750268	2085536	Kclst & Ksclst	5963.80	5965.70	26.99	21.27	25.70	17.20	5941.8
P313489	9.36	01–APR–92	748913	2083062	Qrf	6011.70	6013.58	22.37	16.71	21.10	20.60	6004.2
P313589	7.19	01–APR–92	748510	2083547	Qrf	6008.50	6010.11	13.76	8.08	12.50	11.00	6002.9
P314089	8.18	01–APR–92	749461	2083653	Qrf	5996.70	5998.49	11.06	5.37	9.79	9.30	5990.3
P314289	13.82	01–APR–92	748216	2083280	Qrf	6010.10	6011.77	14.80	9.11	13.51	13.00	5998.0
P414189	4.88	01–APR–92	749059	2082986	Qrf	6010.60	6012.18	19.78	14.09	18.50	18.00	6007.3
P415889	11.22	01–APR–92	749125	2080718	Qrf	6050.40	6052.60	44.50	38.75	43.20	49.50	6041.4
P415989	3.46	01–APR–92	749025	2081011	Qrf	6044.90	6046.71	28.00	22.30	26.73	34.00	6043.3
P416089	4.04	01–APR–92	748605	2080720	Qrf	6051.70	6053.95	35.39	29.24	34.00	33.50	6049.9
P416189	5.52	01–APR–92	748606	2081120	Qrf	6045.60	6047.95	30.94	25.23	29.66	29.20	6042.4
P416289	10.94	01–APR–92	748598	2081555	Qrf	6038.60	6040.22	24.77	19.07	23.50	23.00	6029.3
P416389	5.52	01–APR–92	748313	2080631	Qrf	6055.40	6057.14	31.40	25.69	30.10	30.00	6051.6
P416489	9.37	01–APR–92	748210	2081113	Qrf	6048.50	6050.15	26.98	21.27	25.70	25.20	6040.8
P416589	23.66	01–APR–92	748211	2081546	Qrf	6041.20	6042.81	32.10	27.04	31.00	30.50	6019.2
P416689	27.97	01–APR–92	748147	2081941	Qrf	6035.00	6036.55	33.76	28.09	32.50	32.00	6008.6
P416789	22.85	01–APR–92	748206	2082382	Qrf	6027.80	6029.27	28.20	22.48	26.90	26.40	6006.4
P416889	14.03	01–APR–92	748206	2082815	Qrf	6017.40	6018.79	21.52	15.86	20.27	20.20	6004.8
P207989	20.71	06–APR–92	750671	2085330	Kclst	5963.09	5965.17	21.73	11.00	20.48	5.80	5944.5
P317989	3.88	06–APR–92	748891	2084272	Qrf	5990.90	5992.84	8.73	3.00	7.49	6.40	5989.0
P320089	10.19	06–APR–92	748799	2083280	Qrf	6009.90	6011.87	20.08	14.38	18.81	18.80	6001.7
P418289	6.31	06–APR–92	748952	2082653	Qrf	6016.90	6018.20	26.70	9.60	23.50	23.00	6011.9
2391	DRY	03–APR–92	749853	2086600	Qrf	5956.82	5958.43	8.00	3.00	6.00	6.90	DRY
07391	5.06	03–APR–92	748547	2085827	Qrf & Kclst	5949.14	5950.61	13.40	5.40	11.40	8.10	5945.6
09691	5.99	03–APR–92	748572	2086038	Ksltss & Kclst	5935.64	5937.05	16.00	6.00	14.00	3.10	5931.1
33491	10.76	03–APR–92	748080	2084883	Qc & Ksclst	5926.06	5928.59	11.10	6.68	8.69	8.00	5917.8

APPENDIX 4.1
Industrial Area IM/IRA/DD
Water-Level Measurements in Industrial Area Monitoring Wells, Spring and Fall 1992

WELL	DTW	DATE	STATE NORTH	STATE EAST	COMPLETION UNIT/LITH	SURFACE ELEV.	TOP OF CASING	TD CSG	TOP SCRN	BOT SCRN	TOP OF BEDROCK	WLE
33691	10.93	03-APR-92	748112	2084994	Qc	5926.99	5929.24	10.60	6.19	8.11	7.80	5918.3
34591	12.8	03-APR-92	748462	2085621	Qc & Kclst	5952.19	5954.63	11.30	6.90	8.90	8.20	5941.8
34791	1.92	03-APR-92	748377	2085521	Qc	5951.39	5953.91	10.42	6.00	8.00	8.00	5952.0
36191	5.72	03-APR-92	748091	2084198	Qc	5962.89	5965.17	17.00	9.52	14.60	14.00	5959.5
36391	22.54	03-APR-92	748042	2084294	Qrf	5964.57	5967.01	29.80	17.43	27.41	26.40	5944.5
36691	26.68	03-APR-92	748027	2084421	Qc	5949.76	5951.52	27.83	15.83	25.83	25.00	5924.8
37191	5.61	03-APR-92	748036	2084533	Qc	5945.91	5948.29	23.07	11.12	21.07	20.50	5942.7
37591	5.73	03-APR-92	748580	2084610	Qrf	5991.42	5993.45	14.60	7.60	12.60	12.00	5987.7
37691	13.28	03-APR-92	748692	2085217	Qrf	5984.46	5985.24	18.50	6.51	16.50	16.20	5972.0
37891	38.94	03-APR-92	748075	2084915	Kcsltst & Ksltst	5925.22	5926.29	55.20	43.20	53.20	4.70	5887.4
37991	47.76	03-APR-92	748063	2084731	Kcsltst & Kssltst	5931.45	5933.55	57.20	45.20	55.20	6.90	5885.8
38191	7.68	03-APR-92	748014	2084765	Qc	5924.47	5926.40	17.00	10.00	15.00	14.70	5918.7
38291	DRY	03-APR-92	748032	2084801	Qc	5924.49	5926.71	10.70	6.70	8.70	8.40	DRY
39691	8.25	03-APR-92	748357	2083634	Qrf & Kclst	6006.26	6008.37	11.00	7.00	9.00	8.00	6000.1
06591	10.32	06-APR-92	749064	2085535	Ksclst & Ksltclst	5978.28	5979.78	50.00	33.00	48.00	15.40	5969.5
06891	6.24	06-APR-92	749258	2085883	Qrf	5974.14	5975.62	16.00	6.00	14.00	14.00	5969.4
06991	8.91	06-APR-92	749168	2085990	Qrf	5972.91	5974.57	31.00	14.00	29.00	28.60	5965.7
07191	14.57	06-APR-92	748850	2085908	Qrf	5974.79	5976.34	23.10	11.10	21.10	20.00	5961.8
07291	16.06	06-APR-92	748748	2085766	Qrf	5977.27	5978.80	22.60	10.60	20.60	20.00	5962.7
08891	12.77	06-APR-92	749128	2085866	Qrf	5976.36	5978.06	27.30	15.30	25.30	23.00	5965.3
09091	14.86	06-APR-92	748918	2085943	Qrf	5975.16	5976.79	26.70	14.70	24.70	24.00	5961.9
13191	11.6	06-APR-92	749071	2085530	Ksclst	5978.25	5979.90	27.70	15.70	25.70	15.40	5968.3
13291	9.21	06-APR-92	749060	2085523	Qrf	5978.48	5979.97	17.70	5.70	15.70	15.40	5970.8
35391	11.09	06-APR-92	748011	2083907	Kclst	5960.73	5963.03	10.50	6.10	8.11	6.00	5951.9
37791	19.54	06-APR-92	748592	2083753	Qrf	6002.16	6004.18	22.60	10.60	20.60	20.00	5984.6

SUPPLEMENTAL SPRING 1992 DATA:

WELL	DTW	DATE	STATE NORTH	STATE EAST	COMPLETION UNIT/LITH	SURFACE ELEV.	TOP OF CASING	TD CSG	TOP SCRN	BOT SCRN	TOP OF BEDROCK	WLE
0987	14.83	07-APR-92	749068	2085348	Kss	5980.22	5981.70	32.40	14.50	32.15	12.50	5966.9
1087	13.05	07-APR-92	748946	2085290	Qrf	5981.95	5983.52	12.00	3.50	12.00	11.30	5970.5
3486	20.9	07-APR-92	750162	2086193	Kcss & Kcslt	5912.00	5913.95	56.25	44.24	56.25	16.00	5893.1
3586	6.15	07-APR-92	750167	2086219	Qc	5910.75	5912.76	11.60	4.86	11.60	10.50	5906.6
P207889	4.74	07-APR-92	750671	2085343	Qrf	5962.82	5964.90	8.95	3.26	7.70	8.50	5960.2
P210089	19.09	07-APR-92	751564	2084639	Ksltclst	5898.40	5900.40	22.93	12.20	21.50	7.20	5881.3
01791	8.89	08-APR-92	749504	2086018	Ksltss & Ksclst	5965.78	5967.41	20.00	10.00	18.00	8.00	5958.5
01891	9.1	08-APR-92	749438	2086023	Ksltss & Ksltclst	5971.76	5973.37	32.00	20.00	30.00	12.40	5964.3
02091	8.21	08-APR-92	749617	2086428	Ksclst, Ksslt, Ksltclst	5965.19	5966.65	32.60	15.60	30.60	16.10	5958.4
02291	8.08	08-APR-92	749880	2086139	Ksclst & Kcss	5936.66	5938.26	18.50	11.50	16.50	8.80	5930.2
02491	9.41	08-APR-92	749949	2086432	Ksltss, Ksslt	5944.54	5946.21	18.80	11.80	16.80	8.50	5936.8

FINAL

APPENDIX 4.1
Industrial Area IM/IRA/DD
Water–Level Measurements in Industrial Area Monitoring Wells, Spring and Fall 1992

WELL	DTW	DATE	STATE NORTH	STATE EAST	COMPLETION UNIT/LITH	SURFACE ELEV.	TOP OF CASING	TD CSG	TOP SCRN	BOT SCRN	TOP OF BEDROCK	WLE
02691	5.34	08–APR–92	750385	2086043	Kseltss & Kseltclst	5934.78	5936.38	18.00	6.00	16.00	1.10	5931.0
12091	9.77	08–APR–92	749436	2086009	Kseltss	5971.59	5973.27	24.00	14.00	22.00	13.20	5963.5
12291	14.29	08–APR–92	749429	2085441	Kcss & Kss	5970.98	5972.73	16.10	7.10	14.10	2.00	5958.4
1986	2.53	08–APR–92	750894	2083296	Kclst	5943.08	5943.86	12.25	3.00	12.25	11.50	5941.3
33891	11.38	08–APR–92	747961	2084641	Qc & Kclst	5927.54	5929.94	11.10	6.70	8.70	8.10	5918.6
35991	18.03	08–APR–92	748057	2083756	Qc	5973.25	5976.45	16.10	8.68	13.70	12.20	5958.4
4386	12.9	08–APR–92	749404	2085869	Qrf	5972.91	5974.46	16.75	3.99	16.75	17.00	5961.6
2486	8.3	09–APR–92	750338	2084277	Qrf	5982.45	5983.56	7.45	2.95	7.45	7.20	5975.3
3987	83.23	09–APR–92	751081	2085268	Ksslt & Kclst	5946.95	5948.42	117.39	109.99	117.14	3.50	5865.2
B208089	11.83	09–APR–92	751143	2085876	Qc	5935.40	5937.07	14.16	3.40	12.90	12.20	5925.2
B208189	5.03	09–APR–92	751138	2085885	Kclst	5935.40	5937.46	27.58	16.90	26.34	11.00	5932.4
P208889	84.81	09–APR–92	751086	2085249	Kseltclst	5947.30	5949.25	99.16	87.76	96.94	5.50	5864.4
P209189	10.57	09–APR–92	750762	2084309	Kss & Kseltclst	5980.66	5982.21	36.08	13.30	35.01	10.30	5971.6
P209589	18.06	09–APR–92	751071	2085286	Kseltclst & Ksclst	5948.17	5950.04	19.77	9.07	18.52	4.10	5932.0
P416989	16.37	09–APR–92	748780	2081034	Ksslt & Kslt	6045.20	6047.55	157.95	151.16	155.61	30.00	6031.2
00191	9.32	13–APR–92	749237	2086244	Qrf	5968.86	5970.44	27.00	15.00	25.00	24.20	5961.1
01391	12.3	13–APR–92	749402	2085226	Qrf	5973.70	5975.30	16.00	6.00	14.00	14.50	5963.0
01491	14.34	13–APR–92	749430	2085474	Kss & Kcs	5970.37	5972.03	26.00	14.00	24.00	1.60	5957.7
02191	DRY	13–APR–92	749708	2086166	Qrf	5965.81	5967.51	15.00	8.00	13.00	13.50	DRY
2286	7.72	13–APR–92	750718	2084411	Qrf	5978.77	5979.55	11.20	3.20	11.20	11.00	5971.8
2786	75.98	13–APR–92	750781	2085238	Kssltss & Ksclst	5962.89	5963.88	133.00	128.50	133.00	11.00	5887.9
3386	6.4	13–APR–92	749950	2085003	Qrf	5951.40	5952.42	7.34	2.99	7.34	6.80	5946.0
3787	6.29	13–APR–92	750494	2085224	Qrf	5967.52	5968.99	9.00	3.50	8.77	8.00	5962.7
2686	10.47	14–APR–92	750411	2084841	Qrf	5975.42	5977.17	11.00	3.75	11.00	10.50	5966.7
P207589	25.62	14–APR–92	750395	2084843	Kseltclst	5974.06	5975.96	25.10	14.40	23.86	9.40	5950.3
2187	9.57	15–APR–92	749969	2085799	Qc	5928.43	5929.69	10.56	3.26	10.41	8.00	5920.1
2287	80.44	15–APR–92	749924	2085822	Kss & Kslt	5931.18	5932.80	88.70	81.41	88.46	12.80	5852.4
P207689	7.15	15–APR–92	750398	2085318	Qrf	5966.32	5967.88	14.36	3.64	13.10	12.60	5960.7
P207789	29.23	15–APR–92	750392	2085343	Kseltclst	5965.88	5967.75	28.63	17.90	27.34	12.90	5938.5
2186	32.62	16–APR–92	750855	2082501	Kss & Kseltclst	6004.76	6005.96	67.25	35.00	67.24	15.00	5973.3
3186	DRY	20–APR–92	751051	2084764	Kss & Kslt	5964.98	5967.05	17.32	2.46	17.32	0.50	DRY
3887	9.03	20–APR–92	750396	2085094	Qrf	5972.15	5973.90	9.50	3.50	9.27	7.80	5964.9
P208989	13.83	20–APR–92	751044	2084839	Kseltss & Kseltclst	5962.53	5964.56	26.12	15.40	24.84	3.50	5950.7
P209889	4.62	20–APR–92	751194	2084984	Kseltclst	5940.28	5942.40	19.63	8.89	18.33	3.90	5937.8
P218089	5.44	20–APR–92	749941	2084020	Qrf	5985.80	5987.55	8.69	3.00	7.43	6.00	5982.1
5287	9.59	22–APR–92	748145	2084067	fill?	5967.85	5969.57	20.50	3.50	20.25	20.00	5960.0
6186	9.79	22–APR–92	749198	2083717	Qrf	5999.47	6000.60	12.25	5.00	12.00	11.50	5990.8
P209289	14.68	22–APR–92	750863	2084139	Qrf	5981.59	5983.42	13.40	8.20	12.66	12.20	5968.7
P317989	4.95	22–APR–92	748891	2084272	Qrf	5990.90	5992.84	8.73	3.00	7.49	6.40	5987.9
4486	6.9	23–APR–92	749254	2082234	Qrf	6019.93	6021.96	26.25	3.23	26.25	25.50	6015.1

APPENDIX 4.1
Industrial Area IM/IRA/DD
Water-Level Measurements in Industrial Area Monitoring Wells, Spring and Fall 1992

WELL	DTW	DATE	STATE NORTH	STATE EAST	COMPLETION UNIT/LITH	SURFACE ELEV.	TOP OF CASING	TD CSG	TOP SCRN	BOT SCRN	TOP OF BEDROCK	WLE
P209389	18.53	23-APR-92	750864	2084130	Kss & Ksltss & Kcss	5981.47	5983.39	30.05	16.82	28.80	13.80	5964.9
P209489	27.97	23-APR-92	750991	2084634	Kss & Ksltss	5977.98	5980.10	36.25	15.48	35.00	9.00	5952.1
P209789	6.37	24-APR-92	750579	2085481	Qrf	5962.82	5964.94	13.75	3.00	12.50	12.00	5958.6
P418289	7.72	24-APR-92	748952	2082653	Qrf	6016.90	6018.20	26.70	9.60	23.50	23.00	6010.5
P209089	27.09	27-APR-92	750566	2084910	Ksltclst	5972.16	5974.25	27.21	16.50	25.98	11.50	5947.2
P209689	28.14	27-APR-92	750533	2085514	Ksltclst	5962.63	5964.43	27.93	17.20	26.67	12.20	5936.3
P320089	11.81	27-APR-92	748799	2083280	Qrf	6009.90	6011.87	20.08	14.38	18.81	18.80	6000.1
P207389	6.66	28-APR-92	750195	2084468	Kss & Kclst	5981.02	5982.77	16.22	10.53	15.18	7.00	5976.1
P207489	6.73	28-APR-92	750197	2084481	Qrf	5980.71	5982.64	8.23	2.39	7.00	6.50	5975.9
5387	6.12	29-APR-92	747985	2083912	Qc	5959.99	5961.81	9.30	3.50	9.05	10.00	5955.7
5487	4.28	29-APR-92	747985	2084032	Qc	5955.85	5957.62	4.68	1.33	4.53	4.00	5953.3
1787	10.86	30-APR-92	749415	2086308	Qrf	5968.01	5969.56	25.75	3.50	25.50	25.00	5958.7
2986	9.06	30-APR-92	750599	2085687	Qrf	5959.58	5960.68	8.77	2.83	8.77	8.50	5951.6
3086	5.02	30-APR-92	751078	2084921	Kclst	5957.42	5958.39	14.93	2.48	14.93	2.50	5953.4
P209989	10.43	30-APR-92	751565	2084649	Qc	5898.10	5900.40	9.58	3.81	8.18	7.70	5890.0
1386	5.02	14-APR-92	751857	2086051	Qc	5840.47	5842.59	9.50	3.09	9.50	9.00	5837.6
1486	11.52	14-APR-92	751856	2085838	Kss & Ksclst	5844.71	5846.71	55.36	39.42	55.38	11.00	5835.2
1586	6.32	13-APR-92	751852	2085812	Qc	5848.43	5850.63	14.44	4.09	14.44	12.50	5844.3
1686	5.5	07-APR-92	751747	2085260	Ksltss	5867.92	5869.55	45.06	39.06	45.06	7.00	5864.1
1786	6.02	07-APR-92	751740	2085242	Qc	5868.43	5869.57	13.98	3.73	13.98	12.50	5863.6
1886	9	09-APR-92	751522	2085831	Qc	5885.75	5887.97	7.50	3.74	7.50	8.00	5879.0
37791	19.54	06-APR-92	748592	2083753	Qrf	6002.16	6004.18	22.60	10.60	20.60	20.00	5984.6
B208289	17.09	09-APR-92	751739	2086289	Ksltclst & Kclst	5850.70	5852.95	16.16	5.95	15.42	0.20	5835.9
B208589	3.95	09-APR-92	751804	2085477	Qc	5856.50	5858.35	5.07	3.23	3.99	3.60	5854.4
B208689	18.59	07-APR-92	751728	2085250	Ksltclst	5867.60	5869.60	23.07	12.32	21.80	7.30	5851.0
B208789	3.97	08-APR-92	751755	2084450	Qc	5907.10	5909.03	12.32	2.88	10.93	8.40	5905.1
B210489	4.16	10-APR-92	751802	2085513	Qc	5856.40	5858.71	8.67	2.98	7.41	7.00	5854.6

FALL 1992 WATER LEVEL DATA:

WELL	DTW	DATE	STATE NORTH	STATE EAST	COMPLETION UNIT/LITH	SURFACE ELEV.	TOP OF CASING	TD CSG	TOP SCRN	BOT SCRN	TOP OF BEDROCK	WLE
1386	8.11	02-OCT-92	751857	2086051	Qc	5840.47	5842.59	9.50	3.09	9.50	9.00	5834.5
1486	10.91	02-OCT-92	751856	2085838	Kss & Ksclst	5844.71	5846.71	55.36	39.42	55.36	11.00	5835.8
1586	7.16	02-OCT-92	751852	2085812	Qc	5848.43	5850.63	14.44	4.09	14.44	12.50	5843.5
1686	6.66	02-OCT-92	751747	2085260	Ksltss	5867.92	5869.55	45.06	39.06	45.06	7.00	5862.9
1786	6.61	02-OCT-92	751740	2085242	Qc	5868.43	5869.57	13.98	3.73	13.98	12.50	5863.0
1886	DRY	02-OCT-92	751522	2085831	Qc	5885.75	5887.97	7.50	3.74	7.50	8.00	DRY
1986	3.07	05-OCT-92	750894	2083296	Kclst	5943.08	5943.86	12.25	3.00	12.25	11.50	5940.8
2186	33.86	05-OCT-92	750855	2082501	Kss & Ksltclst	6004.76	6005.96	67.25	35.00	67.24	15.00	5972.1
2286	10.03	05-OCT-92	750718	2084411	Qrf	5978.77	5979.55	11.20	3.20	11.20	11.00	5969.5

APPENDIX 4.1
Industrial Area IM/IRA/DD
Water-Level Measurements in Industrial Area Monitoring Wells, Spring and Fall 1992

WELL	DTW	DATE	STATE NORTH	STATE EAST	COMPLETION UNIT/LITH	SURFACE ELEV.	TOP OF CASING	TD CSG	TOP SCRN	BOT SCRN	TOP OF BEDROCK	WLE
2386	88.05	05-OCT-92	750338	2084259	Kslt & Ksltclst	5982.46	5982.46	117.25	113.00	117.25	8.20	5894.4
2486	DRY	05-OCT-92	750338	2084277	Qrf	5982.45	5983.56	7.45	2.95	7.45	7.20	DRY
2586	30.16	05-OCT-92	750412	2084831	Ksltclst & Kclst	5975.24	5977.14	82.00	59.90	82.00	8.00	5947.0
2686	12	05-OCT-92	750411	2084841	Qrf	5975.42	5977.17	11.00	3.75	11.00	10.50	5965.2
2786	77	05-OCT-92	750781	2085238	Ksslts & Ksclst	5962.89	5963.88	133.00	128.50	133.00	11.00	5886.9
2986	DRY	05-OCT-92	750599	2085687	Qrf	5959.58	5960.68	8.77	2.83	8.77	8.50	DRY
3086	7.36	05-OCT-92	751078	2084921	Kclst	5957.42	5958.39	14.93	2.48	14.93	2.50	5951.0
3186	19.56	05-OCT-92	751051	2084764	Kss & Kslt	5964.98	5967.05	17.32	2.46	17.32	0.50	5947.5
3286	53.91	05-OCT-92	751050	2084743	Kss & Ksltss	5966.08	5967.92	125.50	114.90	125.50	1.00	5914.0
3386	8.68	05-OCT-92	749950	2085003	Qrf	5951.40	5952.42	7.34	2.99	7.34	6.80	5943.7
3486	21.5	01-OCT-92	750162	2086193	Kcss & Kcslt	5912.00	5913.95	56.25	44.24	56.25	16.00	5892.5
3586	9.87	01-OCT-92	750167	2086219	Qc	5910.75	5912.76	11.60	4.86	11.60	10.50	5902.9
4386	DRY	01-OCT-92	749404	2085869	Qrf	5972.91	5974.46	16.75	3.99	16.75	17.00	DRY
4486	8.14	01-OCT-92	749254	2082234	Qrf	6019.93	6021.96	26.25	3.23	26.25	25.50	6013.8
0187	10.41	01-OCT-92	748127	2083653	fill	5992.49	5994.08	12.08	3.38	11.83	11.80	5983.7
0587	44.59	01-OCT-92	748081	2084849	Kss & Ksltss	5927.85	5929.99	51.50	42.00	51.25	11.00	5885.4
0987	19.39	02-OCT-92	749068	2085348	Kss	5980.22	5981.70	32.40	14.50	32.15	12.50	5962.3
1087	DRY	01-OCT-92	748946	2085290	Qrf	5981.95	5983.52	12.00	3.50	12.00	11.30	DRY
1087	13.77	02-OCT-92	748946	2085290	Qrf	5981.95	5983.52	12.00	3.50	12.00	11.30	5969.8
1287	10.87	02-OCT-92	748581	2086066	Kcslt	5934.81	5936.30	10.24	4.91	10.01	3.50	5925.4
1587	21.77	02-OCT-92	749011	2086249	Qrf	5971.27	5972.79	22.53	5.80	22.06	21.90	5951.0
1687	90.53	02-OCT-92	749130	2086249	Kslt	5969.49	5970.79	125.24	100.00	125.00	22.20	5880.3
1787	21.2	01-OCT-92	749415	2086308	Qrf	5968.01	5969.56	25.75	3.50	25.50	25.00	5948.4
1887	127.09	01-OCT-92	749404	2086339	Kss & Ksslt	5967.99	5969.49	133.70	127.00	133.45	25.20	5842.4
1987	13.72	01-OCT-92	749623	2086171	Qrf	5968.44	5969.91	11.89	3.50	11.65	10.80	5956.2
2087	108.8	01-OCT-92	749634	2086155	Ksltclst	5968.66	5970.14	116.36	107.26	116.11	11.80	5861.3
2187	7.84	05-OCT-92	749969	2085799	Qc	5928.43	5929.69	10.56	3.26	10.41	8.00	5921.9
2287	80.57	05-OCT-92	749924	2085822	Kss & Kslt	5931.18	5932.80	88.70	81.41	88.46	12.80	5852.2
2387	18.87	01-OCT-92	749404	2085910	Ksltss & Kclst	5972.79	5974.49	37.85	17.19	37.61	15.20	5955.6
3787	9.49	05-OCT-92	750494	2085224	Qrf	5967.52	5968.99	9.00	3.50	8.77	8.00	5959.5
3887	11.15	05-OCT-92	750396	2085094	Qrf	5972.15	5973.90	9.50	3.50	9.27	7.80	5962.8
3987	89.54	05-OCT-92	751081	2085268	Ksslt & Kclst	5946.95	5948.42	117.39	109.99	117.14	3.50	5858.9
4387	9.73	01-OCT-92	748030	2084788	Qc	5925.06	5926.41	12.50	3.50	12.25	12.00	5916.7
4487	DRY	01-OCT-92	748306	2085435	Qc	5949.63	5951.10	3.70	1.50	3.50	3.20	DRY
4587	90.74	01-OCT-92	748313	2085451	Kss & Kslt & Kclst	5949.32	5950.91	101.30	89.50	97.05	4.00	5860.2
5087	DRY	01-OCT-92	748123	2085334	Qc	5933.14	5934.78	13.70	3.50	13.50	12.50	DRY
5387	10.94	01-OCT-92	747985	2083912	Qc	5959.99	5961.81	9.30	3.50	9.05	10.00	5950.9
5487	6	01-OCT-92	747985	2084032	Qc	5955.85	5957.62	4.68	1.33	4.53	4.00	5951.6
5687	8.48	05-OCT-92	750638	2084423	Qrf	5978.39	5979.77	9.92	3.52	9.67	9.40	5971.3
B208089	13.22	02-OCT-92	751143	2085876	Qc	5935.40	5937.07	14.16	3.40	12.90	12.20	5923.9

APPENDIX 4.1
Industrial Area IM/IRA/DD
Water–Level Measurements in Industrial Area Monitoring Wells, Spring and Fall 1992

WELL	DTW	DATE	STATE NORTH	STATE EAST	COMPLETION UNIT/LITH	SURFACE ELEV.	TOP OF CASING	TD CSG	TOP SCRN	BOT SCRN	TOP OF BEDROCK	WLE
B208089	13.27	05–OCT–92	751143	2085876	Qc	5935.40	5937.07	14.16	3.40	12.90	12.20	5923.8
B208189	22.88	02–OCT–92	751138	2085885	Kclst	5935.40	5937.46	27.58	16.90	26.34	11.00	5914.6
B208189	22.72	05–OCT–92	751138	2085885	Kclst	5935.40	5937.46	27.58	16.90	26.34	11.00	5914.7
B208289	17.33	02–OCT–92	751739	2086289	Kaltclst & Kclst	5850.70	5852.95	16.16	5.95	15.42	0.20	5835.6
B208389	DRY	02–OCT–92	751687	2085584	Ksclst & Kclst	5876.80	5878.66	9.05	3.37	7.80	0.20	DRY
B208489	DRY	02–OCT–92	751683	2085636	Kclst	5876.30	5878.34	30.49	19.76	29.22	15.50	DRY
B208589	DRY	02–OCT–92	751804	2085477	Qc	5856.50	5858.35	5.07	3.23	3.99	3.60	DRY
B208689	14.8	02–OCT–92	751728	2085250	Kaltclst	5867.60	5869.60	23.07	12.32	21.80	7.30	5854.8
B208789	9.77	02–OCT–92	751755	2084450	Qc	5907.10	5909.03	12.32	2.88	10.93	8.40	5899.3
B210489	6.42	02–OCT–92	751802	2085513	Qc	5856.40	5858.71	8.67	2.98	7.41	7.00	5852.3
P114389	8.17	01–OCT–92	750337	2081246	Qrf	6033.40	6035.43	50.10	44.40	48.80	48.30	6027.3
P114489	14.58	01–OCT–92	750337	2081246	Qrf	6033.40	6035.43	50.10	44.40	48.80	48.30	6020.9
P114589	7.64	01–OCT–92	750396	2081731	Qrf	6024.10	6025.90	37.60	32.54	36.50	27.50	6018.3
P114689	12.24	01–OCT–92	749943	2083044	Qrf	6004.00	6005.76	23.50	17.83	22.24	22.00	5993.5
P114789	8.04	01–OCT–92	749940	2082610	Qrf	6010.70	6012.40	27.60	21.81	26.23	26.00	6004.4
P114889	5.52	01–OCT–92	749926	2082127	Qrf	6016.60	6018.26	15.55	9.89	14.30	13.80	6012.7
P114989	12.77	01–OCT–92	749959	2081661	Qrf	6029.80	6031.84	39.30	33.59	38.00	37.50	6019.1
P115089	15.89	01–OCT–92	749930	2081258	Qrf	6038.10	6040.10	42.01	36.27	40.70	40.20	6024.2
P115489	11.28	01–OCT–92	749507	2082135	Qrf	6023.40	6025.10	27.75	22.09	26.50	26.00	6013.8
P115589	8.17	01–OCT–92	749551	2082658	Qrf	6014.10	6015.77	30.70	25.05	29.48	29.00	6007.6
P115689	13.02	01–OCT–92	749532	2083019	Qrf	6006.90	6008.71	21.31	16.23	20.20	19.70	5995.7
P119389	5.73	05–OCT–92	750280	2081921	Qrf	6011.70	6013.18	18.21	12.50	16.90	16.40	6007.5
P207389	8.69	05–OCT–92	750195	2084468	Kss & Kclst	5981.02	5982.77	16.22	10.53	15.18	7.00	5974.1
P207489	8.53	05–OCT–92	750197	2084481	Qrf	5980.71	5982.64	8.23	2.39	7.00	6.50	5974.1
P207589	25.58	05–OCT–92	750395	2084843	Kaltclst	5974.06	5975.96	25.10	14.40	23.86	9.40	5950.4
P207689	8.74	05–OCT–92	750398	2085318	Qrf	5966.32	5967.88	14.36	3.64	13.10	12.60	5959.1
P207789	29.17	05–OCT–92	750392	2085343	Kaltclst	5965.88	5967.75	28.63	17.90	27.34	12.90	5938.6
P207889	10.08	05–OCT–92	750671	2085343	Qrf	5962.82	5964.90	8.95	3.28	7.70	8.50	5954.8
P207989	18.45	05–OCT–92	750671	2085330	Kclst	5963.09	5965.17	21.73	11.00	20.48	5.80	5946.7
P208889	86.22	05–OCT–92	751086	2085249	Kaltclst	5947.30	5949.25	99.16	87.76	96.94	5.50	5863.0
P208989	17.55	05–OCT–92	751044	2084839	Kaltss & Kaltclst	5962.53	5964.56	26.12	15.40	24.84	3.50	5947.0
P209089	25.13	05–OCT–92	750566	2084910	Kaltclst	5972.16	5974.25	27.21	16.50	25.96	11.50	5949.1
P209189	13.5	05–OCT–92	750762	2084309	Kss & Kaltclst	5980.66	5982.21	36.08	13.30	35.01	10.30	5968.7
P209289	14.62	05–OCT–92	750863	2084139	Qrf	5981.59	5983.42	13.40	8.20	12.66	12.20	5968.8
P209389	18.42	05–OCT–92	750864	2084130	Kss & Kaltss & Kcss	5981.47	5983.39	30.05	16.82	28.80	13.80	5965.0
P209489	29.37	05–OCT–92	750991	2084634	Kss & Kaltss	5977.98	5980.10	36.25	15.48	35.00	9.00	5950.7
P209589	18.75	05–OCT–92	751071	2085286	Kaltclst & Ksclst	5948.17	5950.04	19.77	9.07	18.52	4.10	5931.3
P209689	28.37	05–OCT–92	750533	2085514	Kaltclst	5962.63	5964.43	27.93	17.20	26.67	12.20	5936.1
P209789	10.05	05–OCT–92	750579	2085481	Qrf	5962.82	5964.94	13.75	3.00	12.50	12.00	5954.9
P209889	5.34	05–OCT–92	751194	2084984	Kaltclst	5940.28	5942.40	19.63	8.89	18.33	3.90	5937.1

APPENDIX 4.1
Industrial Area IM/IRA/DD
Water–Level Measurements in Industrial Area Monitoring Wells, Spring and Fall 1992

WELL	DTW	DATE	STATE NORTH	STATE EAST	COMPLETION UNIT/LITH	SURFACE ELEV.	TOP OF CASING	TD CSG	TOP SCRN	BOT SCRN	TOP OF BEDROCK	WLE
P209989	DRY	02–OCT–92	751565	2084649	Qc	5898.10	5900.40	9.58	3.81	8.18	7.70	DRY
P210089	18.6	05–OCT–92	751564	2084639	Ksltclst	5898.40	5900.40	22.93	12.20	21.50	7.20	5881.8
P210089	18.72	02–OCT–92	751564	2084639	Ksltclst	5898.40	5900.40	22.93	12.20	21.50	7.20	5881.7
P213689	9.47	01–OCT–92	749460	2083736	Qrf	5994.30	5996.04	14.80	9.08	13.50	13.00	5986.6
P213889	DRY	01–OCT–92	750466	2086109	Kss & Kcss	5954.10	5955.94	22.03	11.30	20.83	8.00	DRY
P213989	DRY	01–OCT–92	750468	2086102	Qrf	5954.30	5956.38	7.20	3.29	6.92	6.70	DRY
P215789	15.79	01–OCT–92	749470	2083430	Qrf	6002.00	6003.66	19.59	14.53	18.50	18.00	5987.9
P218089	9.49	05–OCT–92	749941	2084020	Qrf	5985.80	5987.55	8.69	3.00	7.43	6.00	5978.1
P218389	14.53	05–OCT–92	750831	2085648	Qrf	5956.20	5958.45	13.77	8.06	12.50	12.00	5943.9
P219189	9.8	05–OCT–92	751222	2084010	Qc	5941.20	5943.15	12.77	7.08	11.50	11.00	5933.4
P219489	13.46	05–OCT–92	750415	2085651	Qrf	5959.50	5961.15	24.20	18.48	22.90	22.50	5947.7
P219589	22.52	05–OCT–92	750268	2085536	Kclst & Ksclst	5963.80	5965.70	26.99	21.27	25.70	17.20	5943.2
P313589	9.32	01–OCT–92	748510	2083547	Qrf	6008.50	6010.11	13.76	8.08	12.50	11.00	6000.8
P314089	10.05	01–OCT–92	749461	2083653	Qrf	5996.70	5998.49	11.06	5.37	9.79	9.30	5988.4
P314289	13.33	01–OCT–92	748216	2083280	Qrf	6010.10	6011.77	14.80	9.11	13.51	13.00	5998.4
P320089	15.23	02–OCT–92	748799	2083280	Qrf	6009.90	6011.87	20.08	14.38	18.81	18.80	5996.6
P414189	10.87	01–OCT–92	749059	2082986	Qrf	6010.60	6012.18	19.78	14.09	18.50	18.00	6001.3
P415889	16.53	01–OCT–92	749125	2080718	Qrf	6050.40	6052.60	44.50	38.75	43.20	49.50	6036.1
P415989	9.05	01–OCT–92	749025	2081011	Qrf	6044.90	6046.71	28.00	22.30	26.73	34.00	6037.7
P416089	11.36	01–OCT–92	748605	2080720	Qrf	6051.70	6053.95	35.39	29.24	34.00	33.50	6042.6
P416189	11.54	01–OCT–92	748606	2081120	Qrf	6045.60	6047.95	30.94	25.23	29.66	29.20	6036.4
P416289	14.08	01–OCT–92	748598	2081555	Qrf	6038.60	6040.22	24.77	19.07	23.50	23.00	6026.1
P416389	16.48	01–OCT–92	748313	2080631	Qrf	6055.40	6057.14	31.40	25.69	30.10	30.00	6040.7
P416489	19.28	01–OCT–92	748210	2081113	Qrf	6048.50	6050.15	26.98	21.27	25.70	25.20	6030.9
P416589	27.73	01–OCT–92	748211	2081546	Qrf	6041.20	6042.81	32.10	27.04	31.00	30.50	6015.1
P416689	29.73	01–OCT–92	748147	2081941	Qrf	6035.00	6036.55	33.76	28.09	32.50	32.00	6006.8
P416789	27.53	01–OCT–92	748206	2082382	Qrf	6027.80	6029.27	28.20	22.48	26.90	26.40	6001.7
P416889	18.37	01–OCT–92	748206	2082815	Qrf	6017.40	6018.79	21.52	15.86	20.27	20.20	6000.4
P418289	10.42	02–OCT–92	748952	2082653	Qrf	6016.90	6018.20	26.70	9.60	23.50	23.00	6007.8
00191	20.25	02–OCT–92	749237	2086244	Qrf	5968.86	5970.44	0.00	15.00	25.00	24.20	5950.2
01391	12.99	01–OCT–92	749402	2085226	Qrf	5973.70	5975.30	16.00	6.00	14.00	14.50	5962.3
01491	16.21	01–OCT–92	749430	2085474	Kss & Kcs	5970.37	5972.03	26.00	14.00	24.00	1.60	5955.8
01791	15.21	01–OCT–92	749504	2086018	Ksltss & Ksclst	5965.78	5967.41	20.00	10.00	18.00	8.00	5952.2
01891	19.42	01–OCT–92	749438	2086023	Ksltss & Ksltclst	5971.76	5973.37	32.00	20.00	30.00	12.40	5954.0
02091	22.11	01–OCT–92	749617	2086428	Ksclst, Ksslt, Ksltclst	5965.19	5966.65	32.60	15.60	30.60	16.10	5944.5
02191	DRY	01–OCT–92	749708	2086166	Qrf	5965.81	5967.51	15.00	8.00	13.00	13.50	DRY
02291	13.51	01–OCT–92	749880	2086139	Ksclst & Kcss	5936.66	5938.26	18.50	11.50	16.50	8.80	5924.8
2391	DRY	02–OCT–92	749853	2086600	Qrf	5956.82	5958.43	8.00	3.00	6.00	6.90	DRY
02491	16.9	01–OCT–92	749949	2086432	Ksltss, Ksslt	5944.54	5946.21	18.80	11.80	16.80	8.50	5929.3
02691	8.81	01–OCT–92	750385	2086043	Ksltss & Ksltclst	5934.78	5936.38	18.00	6.00	16.00	1.10	5927.6

APPENDIX 4.1
Industrial Area IM/IRA/DD
Water-Level Measurements in Industrial Area Monitoring Wells, Spring and Fall 1992

WELL	DTW	DATE	STATE NORTH	STATE EAST	COMPLETION UNIT/LITH	SURFACE ELEV.	TOP OF CASING	TD CSG	TOP SCRN	BOT SCRN	TOP OF BEDROCK	WLE
06591	20.01	02-OCT-92	749064	2085535	Ksclst & Ksltclst	5978.28	5979.78	50.00	33.00	48.00	15.40	5959.8
06691	22.02	02-OCT-92	749068	2085714	Qrf	5978.34	5979.94	25.10	13.10	23.10	22.00	5957.9
06791	22.85	02-OCT-92	748855	2085646	Qrf	5978.87	5980.38	23.20	11.20	21.20	21.20	5957.5
06891	16.18	02-OCT-92	749258	2085883	Qrf	5974.14	5975.62	16.00	6.00	14.00	14.00	5959.4
06991	20.99	02-OCT-92	749168	2085990	Qrf	5972.91	5974.57	31.00	14.00	29.00	28.60	5953.6
07191	21.21	02-OCT-92	748850	2085908	Qrf	5974.79	5976.34	23.10	11.10	21.10	20.00	5955.1
07291	22.12	02-OCT-92	748748	2085766	Qrf	5977.27	5978.80	22.60	10.60	20.60	20.00	5956.7
07391	7.88	02-OCT-92	748547	2085827	Qrf & Kclst	5949.14	5950.61	13.40	5.40	11.40	8.10	5942.7
08891	23.55	02-OCT-92	749128	2085866	Qrf	5976.36	5978.06	27.30	15.30	25.30	23.00	5954.5
09091	23.4	02-OCT-92	748918	2085943	Qrf	5975.16	5976.79	26.70	14.70	24.70	24.00	5953.4
09691	11.3	02-OCT-92	748572	2086038	Ksltss & Kclst	5935.64	5937.05	16.00	6.00	14.00	3.10	5925.8
12091	19.48	01-OCT-92	749436	2086009	Ksltss	5971.59	5973.27	24.00	14.00	22.00	13.20	5953.8
12291	16.3	01-OCT-92	749429	2085441	Kcss & Kss	5970.98	5972.73	16.10	7.10	14.10	2.00	5956.4
13091	21.68	02-OCT-92	748960	2085992	Qrf	5973.68	5975.20	23.30	11.30	21.30	19.50	5953.5
13191	19.48	02-OCT-92	749071	2085530	Ksclst	5978.25	5979.90	27.70	15.70	25.70	15.40	5960.4
13291	DRY	02-OCT-92	749060	2085523	Qrf	5978.48	5979.97	17.70	5.70	15.70	15.40	DRY
13291	DRY	01-OCT-92	749060	2085523	Qrf	5978.48	5979.97	17.70	5.70	15.70	15.40	DRY
33491	10.91	01-OCT-92	748060	2084883	Qc & Ksclst	5926.06	5928.59	11.10	6.68	8.69	8.00	5917.7
33691	10.31	01-OCT-92	748112	2084994	Qc	5926.99	5929.24	10.60	6.19	8.11	7.80	5918.9
33891	10.6	01-OCT-92	747961	2084641	Qc & Kclst	5927.54	5929.94	11.10	6.70	8.70	8.10	5919.3
34591	13.61	02-OCT-92	748462	2085621	Qc & Kclst	5952.19	5954.63	11.30	6.90	8.90	8.20	5941.0
34791	6.41	02-OCT-92	748377	2085521	Qc	5951.39	5953.91	10.42	6.00	8.00	8.00	5947.5
35391	12.49	01-OCT-92	748011	2083907	Kclst	5960.73	5963.03	10.50	6.10	8.11	6.00	5950.5
35991	17.24	01-OCT-92	748057	2083756	Qc	5973.25	5976.45	16.10	8.68	13.70	12.20	5959.2
36191	10.37	01-OCT-92	748091	2084198	Qc	5962.89	5965.17	17.00	9.52	14.60	14.00	5954.8
36391	26.09	01-OCT-92	748042	2084294	Qrf	5964.57	5967.01	29.80	17.43	27.41	26.40	5940.9
36691	25.83	01-OCT-92	748027	2084421	Qc	5949.76	5951.52	27.83	15.83	25.83	25.00	5925.7
37191	9.59	01-OCT-92	748036	2084533	Qc	5945.91	5948.29	23.07	11.12	21.07	20.50	5938.7
37591	9.73	01-OCT-92	748580	2084610	Qrf	5991.42	5993.45	14.60	7.60	12.60	12.00	5983.7
37691	DRY	01-OCT-92	748692	2085217	Qrf	5984.46	5985.24	18.50	6.51	16.50	16.20	DRY
37891	40.8	01-OCT-92	748075	2084915	Kcsltst & Ksltst	5925.22	5926.29	55.20	43.20	53.20	4.70	5885.5
37991	47.77	01-OCT-92	748063	2084731	Kcsltst & Kssltst	5931.45	5933.55	57.20	45.20	55.20	6.90	5885.8
38191	11.19	01-OCT-92	748014	2084765	Qc	5924.47	5926.40	17.00	10.00	15.00	14.70	5915.2
38291	12.71	01-OCT-92	748032	2084801	Qc	5924.49	5926.71	10.70	6.70	8.70	8.40	5914.0
39691	12.88	01-OCT-92	748357	2083634	Qrf & Kclst	6006.26	6008.37	11.00	7.00	9.00	8.00	5995.5

SUPPLEMENTAL FALL 1992 DATA:

2186	33.86	06-OCT-92	750855	2082501	Kss & Ksltclst	6004.76	6005.96	67.25	35.00	67.24	15.00	5972.1

APPENDIX 4.1
Industrial Area IM/IRA/DD
Water-Level Measurements in Industrial Area Monitoring Wells, Spring and Fall 1992

WELL	DTW	DATE	STATE NORTH	STATE EAST	COMPLETION UNIT/LITH	SURFACE ELEV.	TOP OF CASING	TD CSG	TOP SCRN	BOT SCRN	TOP OF BEDROCK	WLE
2286	10.03	06-OCT-92	750718	2084411	Qrf	5978.77	5979.55	11.20	3.20	11.20	11.00	5969.5
2386	87.75	06-OCT-92	750338	2084259	Kslt & Ksltclst	5982.46	5982.46	117.25	113.00	117.25	8.20	5894.7
5687	8.5	06-OCT-92	750638	2084423	Qrf	5978.39	5979.77	9.92	3.52	9.67	9.40	5971.3
B208189	22.72	06-OCT-92	751138	2085885	Kclst	5935.40	5937.46	27.58	16.90	26.34	11.00	5914.7
P218089	9.49	06-OCT-92	749941	2084020	Qrf	5985.80	5987.55	8.69	3.00	7.43	6.00	5978.1
P419689	20.04	06-OCT-92	748522	2082513	Qrf & Kss	6022.40	6023.42	24.77	19.08	23.50	22.00	6003.4
1986	3.07	07-OCT-92	750894	2083296	Kclst	5943.08	5943.86	12.25	3.00	12.25	11.50	5940.8
2486	DRY	07-OCT-92	750338	2084277	Qrf	5982.45	5983.56	7.45	2.95	7.45	7.20	DRY
2986	DRY	07-OCT-92	750599	2085687	Qrf	5959.58	5960.68	8.77	2.83	8.77	8.50	DRY
P207989	18.35	07-OCT-92	750671	2085330	Kclst	5963.09	5965.17	21.73	11.00	20.48	5.80	5946.8
P209289	14.58	07-OCT-92	750863	2084139	Qrf	5981.59	5983.42	13.40	8.20	12.66	12.20	5968.8
P209389	18.4	07-OCT-92	750864	2084130	Kss & Ksltss & Kcss	5981.47	5983.39	30.05	16.82	28.80	13.80	5965.0
3086	7.36	08-OCT-92	751078	2081921	Kclst	5957.42	5958.39	14.93	2.48	14.93	2.50	5951.0
3286	53.91	08-OCT-92	751050	2084743	Kss & Ksltss	5966.08	5967.92	125.50	114.90	125.50	1.00	5914.0
P207789	29.14	08-OCT-92	750392	2085343	Ksltclst	5965.88	5967.75	28.63	17.90	27.34	12.90	5938.6
P208989	17.55	08-OCT-92	751044	2084839	Ksltss & Ksltclst	5962.53	5964.56	26.12	15.40	24.84	3.50	5947.0
P209089	25	08-OCT-92	750566	2084910	Ksltclst	5972.16	5974.25	27.21	16.50	25.96	11.50	5949.3
P209889	5.34	08-OCT-92	751194	2084984	Ksltclst	5940.28	5942.40	19.63	8.89	18.33	3.90	5937.1
36991	DRY	09-OCT-92	748180	2084177	Qrf & Kclst	5969.48	5972.31	10.62	6.62	8.62	8.00	DRY
37791	18.86	09-OCT-92	748592	2083753	Qrf	6002.16	6004.18	22.60	10.60	20.60	20.00	5985.3
5187	15.57	09-OCT-92	748103	2083850	fill?	5963.27	5965.22	14.00	3.58	13.84	12.50	5949.7
5287	10.42	09-OCT-92	748145	2084067	fill?	5967.85	5969.57	20.50	3.50	20.25	20.00	5959.2
6186	10.74	09-OCT-92	749198	2083717	Qrf	5999.47	6000.60	12.25	5.00	12.00	11.50	5989.9
P207689	8.77	09-OCT-92	750398	2085318	Qrf	5966.32	5967.88	14.36	3.64	13.10	12.60	5959.1
P317989	9.68	09-OCT-92	748891	2084272	Qrf	5990.90	5992.84	8.73	3.00	7.49	6.40	5983.2
2187	7.84	12-OCT-92	749969	2085799	Qc	5928.43	5929.69	10.56	3.26	10.41	8.00	5921.9
2287	80.57	12-OCT-92	749924	2085822	Kss & Kslt	5931.18	5932.80	88.70	81.41	88.46	12.80	5852.2
2586	28.66	12-OCT-92	750412	2084831	Ksltclst & Kclst	5975.24	5977.14	82.00	59.90	82.00	8.00	5948.5
2686	12.08	12-OCT-92	750411	2084841	Qrf	5975.42	5977.17	11.00	3.75	11.00	10.50	5965.1
37791	18.86	12-OCT-92	748592	2083753	Qrf	6002.16	6004.18	22.60	10.60	20.60	20.00	5985.3
5187	15.57	12-OCT-92	748103	2083850	fill?	5963.27	5965.22	14.00	3.58	13.84	12.50	5949.7
6186	10.74	12-OCT-92	749198	2083717	Qrf	5999.47	6000.60	12.25	5.00	12.00	11.50	5989.9
P207589	25.49	12-OCT-92	750395	2084843	Ksltclst	5974.06	5975.96	25.10	14.40	23.86	9.40	5950.5
P207889	10.09	12-OCT-92	750671	2085343	Qrf	5962.82	5964.90	8.95	3.26	7.70	8.50	5954.8
P209689	28.29	12-OCT-92	750533	2085514	Ksltclst	5962.63	5964.43	27.93	17.20	26.67	12.20	5936.1
P209189	13.78	13-OCT-92	750762	2084309	Kss & Ksltclst	5980.66	5982.21	36.08	13.30	35.01	10.30	5968.4
P317989	9.68	13-OCT-92	748891	2084272	Qrf	5990.90	5992.84	8.73	3.00	7.49	6.40	5983.2
5287	10.42	14-OCT-92	748145	2084067	fill?	5967.85	5969.57	20.50	3.50	20.25	20.00	5959.2
P209489	29.44	14-OCT-92	750991	2084634	Kss & Ksltss	5977.98	5980.10	36.25	15.48	35.00	9.00	5950.7
2786	73.33	15-OCT-92	750781	2085238	Ksslts & Ksclst	5962.89	5963.88	133.00	128.50	133.00	11.00	5890.6

APPENDIX 4.1 FINAL
Industrial Area IM/IRA/DD
Water-Level Measurements in Industrial Area Monitoring Wells, Spring and Fall 1992

WELL	DTW	DATE	STATE NORTH	STATE EAST	COMPLETION UNIT/LITH	SURFACE ELEV.	TOP OF CASING	TD CSG	TOP SCRN	BOT SCRN	TOP OF BEDROCK	WLE
P209789	10.27	16-OCT-92	750579	2085481	Qrf	5962.82	5964.94	13.75	3.00	12.50	12.00	5954.7
3787	9.8	19-OCT-92	750494	2085224	Qrf	5967.52	5968.99	9.00	3.50	8.77	8.00	5959.2
3887	11.37	19-OCT-92	750396	2085094	Qrf	5972.15	5973.90	9.50	3.50	9.27	7.80	5962.5
P416289	15.37	19-OCT-92	748598	2081555	Qrf	6038.60	6040.22	24.77	19.07	23.50	23.00	6024.9
P418289	11.23	19-OCT-92	748952	2082653	Qrf	6016.90	6018.20	26.70	9.60	23.50	23.00	6007.0
P419689	20.3	19-OCT-92	748522	2082513	Qrf & Kss	6022.40	6023.42	24.77	19.08	23.50	22.00	6003.1
0587	45.11	21-OCT-92	748081	2084849	Kss & Ksltss	5927.85	5929.99	51.50	42.00	51.25	11.00	5884.9
4486	8.68	21-OCT-92	749254	2082234	Qrf	6019.93	6021.96	26.25	3.23	26.25	25.50	6013.3
36391	26.17	23-OCT-92	748042	2084294	Qrf	5964.57	5967.01	29.80	17.43	27.41	26.40	5940.8
33491	10.75	26-OCT-92	748080	2084883	Qc & Ksclst	5926.06	5928.59	11.10	6.68	8.69	8.00	5917.8
33891	10.79	26-OCT-92	747961	2084641	Qc & Kclst	5927.54	5929.94	11.10	6.70	8.70	8.10	5919.2
35391	12.36	26-OCT-92	748011	2083907	Kclst	5960.73	5963.03	10.50	6.10	8.11	6.00	5950.7
36191	8.3	26-OCT-92	748091	2084198	Qc	5962.89	5965.17	17.00	9.52	14.60	14.00	5956.9
36691	25.04	26-OCT-92	748027	2084421	Qc	5949.76	5951.52	27.83	15.83	25.83	25.00	5926.5
37991	48.26	26-OCT-92	748063	2084731	Kcsltst & Kssltst	5931.45	5933.55	57.20	45.20	55.20	6.90	5885.3
0187	10.27	27-OCT-92	748127	2083653	fill	5992.49	5994.08	12.08	3.38	11.83	11.80	5983.8
4387	9.31	27-OCT-92	748030	2084788	Qc	5925.06	5926.41	12.50	3.50	12.25	12.00	5917.1
37591	10.47	28-OCT-92	748580	2084610	Qrf	5991.42	5993.45	14.60	7.60	12.60	12.00	5983.0
P320089	15.71	28-OCT-92	748799	2083280	Qrf	6009.90	6011.87	20.08	14.38	18.81	18.80	5996.2
02291	14.15	29-OCT-92	749880	2086139	Ksclst & Kcss	5936.66	5938.26	18.50	11.50	16.50	8.80	5924.1
37891	41.61	29-OCT-92	748075	2084915	Kcsltst & Ksltst	5925.22	5926.29	55.20	43.20	53.20	4.70	5884.7
4587	90.68	29-OCT-92	748313	2085451	Kss & Kslt & Kclst	5949.32	5950.91	101.30	89.50	97.05	4.00	5860.2
13591	DRY	02-OCT-92	749204	2086612	Qrf	5965.92	5967.55	18.00	6.00	16.00	16.00	DRY
1386	8.67	12-OCT-92	751857	2086051	Qc	5840.47	5842.59	9.50	3.09	9.50	9.00	5833.9
1486	10.8	12-OCT-92	751856	2085838	Kss & Ksclst	5844.71	5846.71	55.36	39.42	55.36	11.00	5835.9
1586	7.08	07-OCT-92	751852	2085812	Qc	5848.43	5850.63	14.44	4.09	14.44	12.50	5843.6
1686	6.54	12-OCT-92	751747	2085260	Ksltss	5867.92	5869.55	45.06	39.06	45.06	7.00	5863.0
1786	8.54	07-OCT-92	751740	2085242	Qc	5868.43	5869.57	13.98	3.73	13.98	12.50	5861.0
37791	18.86	09-OCT-92	748592	2083753	Qrf	6002.16	6004.18	22.60	10.60	20.60	20.00	5985.3
37791	18.86	12-OCT-92	748592	2083753	Qrf	6002.16	6004.18	22.60	10.60	20.60	20.00	5985.3
B208689	13.74	12-OCT-92	751728	2085250	Ksltclst	5867.60	5869.60	23.07	12.32	21.80	7.30	5855.9
B208789	9.79	05-OCT-92	751755	2084450	Qc	5907.10	5909.03	12.32	2.88	10.93	8.40	5899.2
B208289	17.32	05-OCT-92	751739	2086289	Ksltclst & Kclst	5850.70	5852.95	16.16	5.95	15.42	0.20	5835.6
B210489	8.23	08-OCT-92	751802	2085513	Qc	5856.40	5858.71	8.67	2.98	7.41	7.00	5850.5

APPENDIX 4.1

FINAL

Industrial Area IM/IRA/DD

Water-Level Measurements in Industrial Area Monitoring Wells, Spring and Fall 1992

WELL	DTW	DATE	STATE NORTH	STATE EAST	COMPLETION UNIT/LITH	SURFACE ELEV.	TOP OF CASING	TD CSG	TOP SCRN	BOT SCRN	TOP OF BEDROCK	WLE

INDEX:

SURFACE ELEV. = elevation of land surface at well head, in feet above mean sea level

STATE NORTH = State plane coordinates, northing

STATE EAST = State plane coordinates, easting

COMPLETION UNIT/LITH = rock type in which well is screened:
- Kss = Cretaceous sandstone
- Kclst = Cretaceous claystone
- Kcslt = Cretaceous clayey siltstone
- Kcss = Cretaceous clayey sandstone
- Ksclst = Cretaceous sandy claystone
- Kslt = Cretaceous siltstone
- Ksltclst = Cretaceous silty claystone
- Ksltss = Cretaceous silty sandstone
- Ksslt = Cretaceous sandy siltstone
- Qa = Quaternary alluvium
- Qc = Quaternary colluvium
- Qrf = Quaternary Rocky Flats Alluvium

DTW = depth to water, measured in feet from top of casing.

TD CSG = total depth of casing, in feet below ground surface.

TOP SCRN = depth to top of well screen, in feet below ground surface.

BOT SCRN = depth to bottom of well screen, in feet below ground surface.

WLE = water-level elevation, in feet above mean sea level

(intentionally blank)

APPENDIX 4.4
Industrial Area IM/IRA/DD
Historical Groundwater Monitoring Results for 1989 Industrial Area Piezometers, Radionuclides

Well ID Date	P208089 10-8-91	P208189 10-8-91	P207389 10-21-91	P207489 10-21-91	P207589 3-27-91	P207689 10-9-91	P207789 8-7-91
RADIONUCLIDES: AMERICIUM-241	NA	NA	0.003602 ± 0.00418	NA	NA	0.001268 ± 0.00254	NA
CESIUM-137	NA	NA	NA	NA	NA	0.586 ± 0.466	NA
GROSS ALPHA	8.6 ± 3.96	18.06 ± 6.5	NA	2.328 ± 1.36	NA	NA	NA
GROSS ALPHA-DISSOLVED	NA	NA	5.571 ± 2.91	NA	NA	8.254 ± 5.7	NA
GROSS ALPHA-SUSPENDED	NA	NA	NA	NA	NA	NA	NA
GROSS BETA	5.135 ± 2.33	12.78 ± 2.99	NA	2.587 ± 1.49	NA	NA	NA
GROSS BETA-DISSOLVED	NA	NA	5.634 ± 1.83	NA	NA	13.45 ± 4.88	NA
GROSS BETA-SUSPENDED	NA	NA	NA	NA	NA	NA	NA
PLUTONIUM-238	NA	NA	NA	NA	NA	NA	NA
PLUTONIUM-239	NA	NA	NA	NA	NA	NA	NA
PLUTONIUM-239/240	NA	NA	0.0007436 ± 0.00205	NA	NA	0 ± 0.00285	NA
RADIUM-226	NA	NA	0.8664 ± 0.203	NA	NA	0.5205 ± 0.168	NA
RADIUM-228	NA	NA	NA	NA	NA	NA	NA
STRONTIUM-89,90	NA	NA	0.06796 ± 0.206	NA	NA	0.2575 ± 0.248	NA
TRITIUM	424 ± 231	376.5 ± 228	294.3 ± 235	NA	67.5 ± 191	223.7 ± 239	69.63 ± 199
URANIUM-233,-234	3.328 ± 0.972	14.87 ± 2.7	4.275 ± 1.38	2.173 ± 0.848	NA	10.22 ± 1.86	NA
URANIUM-235	NA	0.2287 ± 0.236	-0.0174 ± 0.035	0 ± 0.213	NA	0.1818 ± 0.183	NA
URANIUM-238	2.832 ± 0.882	6.818 ± 1.55	-2.355 ± 0.973	1.889 ± 0.785	NA	8.225 ± 1.59	NA

NA = Not Analyzed.
All results in picocuries per liter.
± Indicates error within two
standard deviation.

APPENDIX 4.4
Industrial Area IM/IRA/DD
Historical Groundwater Monitoring Results for 1989 Industrial Area Piezometers, Radionuclides

Well ID Date	P207889 10-9-91	P207989 10-9-91	P208889 6-7-91	P208989 10-10-89	P209089 3-26-91	P209189 10-10-91	P209389 10-8-91
RADIONUCLIDES:							
AMERICIUM-241	0.00592 ± 0.00533	NA	NA	0.00246 ± 0.00349	NA	0.09905 ± 0.0244	0.00646 ± 0.00527
CESIUM-137	0.1105 ± 0.486	NA	NA	NA	NA	NA	NA
GROSS ALPHA	26.02 ± 10.2	NA	NA	NA	NA	NA	2.165 ± 1.34
GROSS ALPHA-DISSOLVED	NA	NA	6.102 ± 5.43	113.2 ± 43	4.721 ± 1.61	4.156 ± 2.29	NA
GROSS ALPHA-SUSPENDED	NA	NA	NA	NA	NA	NA	NA
GROSS BETA	10.9 ± 3.59	NA	NA	NA	NA	NA	2.636 ± 1.61
GROSS BETA-DISSOLVED	NA	NA	5.99 ± 2.58	73.66 ± 24.8	7.243 ± 1.51	26.64 ± 3.61	NA
GROSS BETA-SUSPENDED	NA	NA	NA	NA	NA	NA	NA
PLUTONIUM-238	NA	NA	NA	NA	NA	NA	NA
PLUTONIUM-239	NA	NA	NA	NA	NA	NA	NA
PLUTONIUM-239/240	0.003804 ± 0.00411	NA	NA	0.002971 ± 0.00444	NA	0.442 ± 0.0599	0.003995 ± 0.00465
RADIUM-226	NA	NA	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA	NA	NA
STRONTIUM-89,90	0.1764 ± 0.198	NA	NA	0.1373 ± 0.233	NA	0.06864 ± 0.21	0.1514 ± 0.201
TRITIUM	NA	111.8 ± 214	207.2 ± 188	1941 ± 329	-30.9 ± 186	258.5 ± 241	642.1 ± 24.3
URANIUM-233,-234	12.89 ± 2.43	NA	1.314 ± 0.532	63.85 ± 8.56	27.06 ± 4.33	4.337 ± 1.05	0.182 ± 0.209
URANIUM-235	0.4088 ± 0.339	NA	0 ± 0.146	1.259 ± 0.503	0.6165 ± 0.388	0.2688 ± 0.231	0.089099 ± 0.098
URANIUM-238	9.729 ± 1.99	NA	0.3329 ± 0.261	36.49 ± 5.17	17.57 ± 3.06	4.749 ± 1.11	0.1092 ± 0.19

NA = Not Analyzed.
All results in picocuries per liter.
± Indicates error within two standard deviation.

APPENDIX 4.4
Industrial Area IM/IRA/DD
Historical Groundwater Monitoring Results for 1989 Industrial Area Piezometers, Radionuclides

Well ID Date	P209489 10-16-91	P209589 10-4-91	P209789 10-11-91	P209889 10-15-91	P210089 10-9-91	P210289 3-26-91	P218089 8-26-91
RADIONUCLIDES:							
AMERICIUM-241	0.017 ± 0.009	NA	0.00217 ± 0.00308	0.0081 ± 0.0065	NA	NA	NA
CESIUM-137	0.1203 ± 0.492	NA	NA	0.1048 ± 0.531	NA	NA	NA
GROSS ALPHA	60.99 ± 20.4	NA	NA	75.05 ± 53.6	NA	NA	NA
GROSS ALPHA-DISSOLVED	NA	NA	5.743 ± 3.64	NA	3.989 ± 4.38	67.82 ± 23.9	NA
GROSS ALPHA-SUSPENDED	NA	NA	NA	NA	NA	NA	NA
GROSS BETA	109.7 ± 13.9	NA	NA	85.02 ± 35.6	NA	NA	NA
GROSS BETA-DISSOLVED	NA	NA	3.863 ± 2.38	NA	17.44 ± 8.12	36.15 ± 8.73	NA
GROSS BETA-SUSPENDED	NA	NA	NA	NA	NA	NA	NA
PLUTONIUM-238	NA	NA	NA	NA	NA	NA	NA
PLUTONIUM-239	NA	NA	NA	NA	NA	NA	NA
PLUTONIUM-239/240	-0.000259 ± 0.0051	NA	0.001967 ± 0.00279	0.0027 ± 0.0038	NA	NA	NA
RADIUM-226	0.4023 ± 0.14	NA	0.3957 ± 0.124	4.058 ± 0.72	NA	NA	NA
RADIUM-228	NA	NA	NA	8.508 ± 2.22	NA	NA	NA
STRONTIUM-89,90	0.08788 ± 0.198	NA	0.4195 ± 0.279	0.4468 ± 0.287	NA	NA	NA
TRITIUM	1030 ± 271	13350 ± 1150	576.1 ± 259	6492 ± 642	13.56 ± 228	152.4 ± 196	383.3 ± 210
URANIUM-233,-234	31.28 ± 5.79	NA	4.321 ± 1.02	37.49 ± 5.28	2.908 ± 0.829	49.31 ± 8.15	NA
URANIUM-235	1.3738 ± 0.756	NA	0.2191 ± 0.198	0.8506 ± 0.4224	0.09547 ± 0.136	1.94 ± 0.838	NA
URANIUM-238	28.564 ± 5.38	NA	3.62 ± 0.913	27.5 ± 4.04	2.482 ± 0.754	41.19 ± 6.96	NA

NA = Not Analyzed.
All results in picocuries per liter.
± Indicates error within two standard deviation.

APPENDIX 4.4

INDUSTRIAL AREA IM/IRA/DD

HISTORICAL GROUNDWATER MONITORING RESULTS FOR 1989

INDUSTRIAL AREA PIEZOMETERS, RADIONUCLIDES

[illegible]

APPENDIX 4.3

FINAL

Industrial Area IM/IRA/DD
Historical Groundwater Monitoring Results for 1989 Industrial Area Piezometers, Selected Metals

Well ID Date	P209789 11-21-91	P209889 11-21-91	P210089 11-21-91	P210289 9-17-90	P320089 10-22-91	P418289 11-11-91
Analyte						
BERYLLIUM	< 5	10	< 5	< 5	< 5	< 5
CADMIUM	< 5	42.8	8.8	< 5	NR	< 5
CHROMIUM	15.1	178	34	< 10	16	16.4
CYANIDE	NR	NR	NR	NR	5	NR
MERCURY	< .2	0.25	< 0.2	0.33	< 0.2	1.6
STRONTIUM	1020	24800	4650	2180	333	622

All values expressed in micrograms per liter.
NR = Not Reported
The "<" symbol designates the analyte concentration is below the detection limit of the analysis.

(intentionally blank)

APPENDIX 4.3

INDUSTRIAL AREA IM/IRA/DD

HISTORICAL GROUNDWATER MONITORING RESULTS FOR 1989

INDUSTRIAL AREA PIEZOMETERS, SELECTED METALS

FINAL

Appendix 4.2
Industrial Area IM/IRA/DD
Historical Groundwater Monitoring Results for
1989 Industrial Area Piezometers, Volatile Organic Compounds

Well ID / Date	B208089 10-14-9	B208189 10-8-91	P207489 10-21-91	P207589 7-19-90	P207689 10-9-91	P207789 12-12-90	P207889 7-11-91	P207989 10-9-91	P208889 10-7-91	P208989 3-24-91	P209089 3-26-91	P209189 10-10-91
Analytes												
1,1,1-TRICHLOROETHANE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2,2-TETRACHLOROETHANE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2-TRICHLOROETHANE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1-DICHLOROETHANE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1-DICHLOROETHENE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-DICHLOROETHANE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5
1,2-DICHLOROETHENE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-DICHLOROPROPANE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
2-BUTANONE	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
4-METHYL-2-PENTANONE	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
ACETONE	< 10	< 10	< 10	< 10	< 10	36	< 10	< 10	< 10	11	13	< 10
BENZENE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
BROMODICHLOROMETHANE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
BROMOFORM	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
BROMOMETHANE	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
CARBON DISULFIDE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
CARBON TETRACHLORIDE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
CHLOROBENZENE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
CHLOROETHANE	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
CHLOROFORM	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
CHLOROMETHANE	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
cis-1,3-DICHLOROPROPENE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
DIBROMOCHLOROMETHANE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
ETHYLBENZENE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
METHYLENE CHLORIDE	< 5	< 5	< 7	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
STYRENE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
TETRACHLOROETHENE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
TOLUENE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
TOTAL XYLENES	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
trans-1,3-DICHLOROPROPENE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
TRICHLOROETHENE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
VINYL ACETATE	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
VINYL CHLORIDE	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2-HEXANONE	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

All values express in micrograms per liter.
The "<" symbol designates the analyte concentration
is below the detection limit of the analysis.
VOCs = Volatile Organic Compounds

Appendix 4.2
Industrial Area IM/IRA/DD
Historical Groundwater Monitoring Results for
1989 Industrial Area Piezometers, Volatile Organic Compounds (continued)

Well ID / Date	P209289 5-29-91	P209389 10-8-91	P209489 10-16-91	P209589 10-4-91	P209789 10-11-91	P320089 10-22-91
Analytes						
1,1,1-TRICHLOROETHANE	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2,2-TETRACHLOROETHANE	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2-TRICHLOROETHANE	< 5	< 5	< 5	< 5	< 5	< 5
1,1-DICHLOROETHANE	< 5	< 5	< 5	< 5	< 5	< 5
1,1-DICHLOROETHENE	10	63	< 5	< 5	< 5	< 5
1,2-DICHLOROETHANE	< 5	< 5	< 5	< 5	< 5	< 5
1,2-DICHLOROETHENE	< 5	< 5	< 5	< 5	< 5	< 5
1,2-DICHLOROPROPANE	< 5	< 5	< 5	< 5	< 5	50
2-BUTANONE	20	< 10	< 10	< 10	< 10	100
4-METHYL-2-PENTANONE	20	< 10	< 10	< 10	< 10	< 10
ACETONE	< 10	< 10	< 10	< 10	< 10	150
BENZENE	< 5	< 5	< 5	< 5	< 5	< 5
BROMODICHLOROMETHANE	< 5	< 5	< 5	< 5	< 5	< 5
BROMOFORM	10	< 5	< 5	< 5	< 5	< 5
BROMOMETHANE	20	< 10	< 10	< 10	< 10	< 10
CARBON DISULFIDE	10	< 5	< 5	< 5	< 5	< 5
CARBON TETRACHLORIDE	330	25	49	< 5	< 5	< 5
CHLOROBENZENE	< 5	< 5	< 5	< 5	< 5	< 5
CHLOROETHANE	< 10	< 10	< 10	< 10	< 10	< 10
CHLOROFORM	100	7	16	< 5	< 5	< 5
CHLOROMETHANE	< 10	< 10	< 10	< 10	< 10	< 10
cis-1,3-DICHLOROPROPENE	< 5	< 5	< 5	< 5	< 5	< 5
DIBROMOCHLOROMETHANE	< 5	< 5	< 5	< 5	< 5	< 5
ETHYLBENZENE	< 5	< 5	< 5	< 5	< 5	< 5
METHYLENE CHLORIDE	< 5	< 5	< 5	< 5	< 5	25
STYRENE	< 5	< 5	< 5	< 5	< 5	50
TETRACHLOROETHENE	< 5	< 5	< 5	< 5	< 5	< 5
TOLUENE	< 5	< 5	< 5	< 5	< 5	< 5
TOTAL XYLENES	< 5	< 5	< 5	< 5	< 5	< 5
trans-1,3-DICHLOROPROPENE	< 5	< 5	< 5	< 5	< 5	< 5
TRICHLOROETHENE	< 5	< 5	57	< 5	< 5	< 5
VINYL ACETATE	< 10	< 10	< 10	< 10	< 10	50
VINYL CHLORIDE	< 10	< 10	< 10	< 10	< 10	150
2-HEXANONE	20	< 10	< 10	< 10	< 10	< 10

All values express in micrograms per liter.
The "<" symbol designates the analyte concentration
is below the detection limit of the analysis.
VOCs = Volatile Organic Compounds

APPENDIX 4.2

INDUSTRIAL AREA IM/IRA/DD

HISTORICAL GROUNDWATER MONITORING RESULTS FOR 1989

INDUSTRIAL AREA PIEZOMETERS

VOLATILE ORGANIC COMPOUNDS

5.0 SURFACE WATER MONITORING

The surface water monitoring program at RFP emphasizes compliance with all regulatory requirements and prescribes that water discharged from the terminal ponds is of high quality. These two objectives have been reinforced by strengthening the NPDES permit for the facility with a Federal Facility Compliance Agreement (FFCA) between EPA and DOE in 1991 and by the AIP between the State of Colorado and DOE in 1989. In addition, the FFCA added requirements for WWTP discharges. Although the activities of the AIP do not have enforceable authority and involve more than compliance, the AIP strengthened existing agreements by allowing the state to sample and analyze terminal pond waters before discharge to ensure water quality requirements were being met. In the AIP, DOE agreed to analyze pond water for radionuclides as well as other constituents related to water quality. Surface water management efforts have been very successful in meeting the objectives of regulatory compliance and ensuring high-quality discharges from the terminal ponds.

It is the objective of this IM/IRA to conduct environmental verification monitoring in a manner sufficient to detect releases to the environment from D&D activities or other nonroutine activities in the Industrial Area. However, because the surface water points of compliance currently are the WWTP discharge and terminal pond discharge, there has not been a rigorous Industrial Area monitoring requirement. As a result, the proposed actions for the surface water verification monitoring will supplement the existing surface water monitoring program that currently is more than adequate to maintain compliance monitoring but insufficient for D&D verification monitoring.

5.1 APPROACH

To evaluate the approach for the Industrial Area monitoring, the current surface water monitoring program at RFP was assessed by identifying and inventorying the existing surface water monitoring programs and documents. The document identification process included interviewing EG&G Surface Water Division personnel and OU managers and performing library searches. More than 30 major surface water documents were reviewed and evaluated for their pertinence to the Industrial Area IM/IRA. In general, documents reviewed included background characterization reports, base flow and storm water characterization reports, innovative and/or experimental monitoring programs, OU-related monitoring programs, and regulatory monitoring programs. After review of these documents and programs, several sources were selected for more intensive review because of their data quality, proximity to the Industrial Area, inclusiveness, usability, current status, and/or accurate description of the current monitoring program. The following documents were determined to be of primary interest to the Industrial Area and are discussed in Sections 5.2 and 5.3:

- *Event-Related Surface-Water Monitoring Report, Rocky Flats Plant: Water Years 1991 and 1992* (EG&G 1993a);

- *Final Surface Water Interim Measures/Interim Remedial Action Plan/Environmental Assessment and Decision Document, South Walnut Creek Basin, Operable Unit No. 2* (DOE 1992a);

- *Proposed Interim Measures/Interim Remedial Action Decision Document for the Solar Evaporation Ponds, Operable Unit No. 4, Final* (DOE 1992b);

- *Application to the Environmental Protection Agency for Authorization to Discharge Under the National Pollutant Discharge Elimination System* (DOE 1992c);

- *Rocky Flats Plant Surface-Water and Sediment Monitoring Program Summary* (EG&G 1993b)

- *Stormwater NPDES Permit—Application Monitoring Program, Rocky Flats Plant Site* (EG&G 1993c);

- *Draft Surface Water Management Plan* (EG&G 1992a);

- *1989 Surface-Water and Sediment Geochemical Characterization Report* (EG&G 1992b); and

- *1990 Surface-Water and Sediment Geochemical Characterization Report* (EG&G 1992c).

These documents were used to assess potential pathways of contaminants in surface water, evaluate data needs and monitoring gaps, assess monitoring alternatives, and propose appropriate actions to supplement the surface water monitoring programs within the Industrial Area.

In some cases, the projects described in these reports were limited in scope and designed to meet specific goals. For example, the stormwater monitoring was designed specifically to respond to regulatory requirements for preparing stormwater permit applications. Technical review indicates that, although the monitoring program successfully met the objectives established by the regulatory requirements for the stormwater permit application, the program may require additional components to meet the objectives of this IM/IRA/DD and anticipated future programmatic needs.

The following sections present descriptions of monitoring programs that are pertinent to the IM/IRA, additional data needs for the purposes of the IM/IRA that are created by the scope limitations described in the previous paragraphs, and proposed actions for future monitoring in accordance with IM/IRA objectives.

5.2 EXISTING MONITORING PROGRAMS

The RFP surface water and sediment monitoring program consists of compliance, operational, and characterization monitoring programs. The details of the monitoring program have changed over the past five years in response to regulatory changes and the need to increase program efficiency. For example, the monitoring programs were expanded during 1989 and 1990 to respond to data-collection needs for CERCLA, RCRA, DOE orders, and Best Management Practice requirements. In 1991 and 1992, surface water monitoring programs were evaluated by EG&G for programmatic efficiency, cost-effectiveness, and technical value. As a result, a variety of programs were eliminated or streamlined for reasons including cost reduction, enhanced performance efficiency, completion of data collection for programs such as the Background Geochemical Characterization program and the NPDES stormwater discharge permit application, and lack of contamination detection at many monitoring locations (EG&G 1992d, 1993b).

As of January 1994, the surface water monitoring system includes (1) all compliance-related monitoring activities including those required by NPDES/FFCA and AIP; (2) operational monitoring under DOE orders; and (3) other activities including the Event-related Monitoring Program, Pond Effluent Treatment Research, and various nonroutine support activities involving water and sediment sampling (EG&G 1993b). See Appendix 5.1, Tables A through D, for sampling locations, analytes, and frequency for these programs.

Many of these monitoring activities focus on the A-, B-, and C-series detention ponds and are not directly pertinent to the Industrial Area IM/IRA; thus, subsequent discussion focuses on the NPDES stormwater monitoring locations, the ongoing Event-Related Surface Water Monitoring Program described in Section 5.2.2, and the WWTP monitoring program. These programs monitor stations closer to the Industrial Area boundary or within the Industrial Area.

5.2.1 NPDES Stormwater Permit - Application Monitoring

The Stormwater NPDES Permit - Application Monitoring Program for RFP was conducted by EG&G in response to Clean Water Act (CWA) NPDES requirements. The goal of the program was to collect water-quality samples during storm runoff or high flow events at selected sites to characterize runoff quantity and quality at RFP (EG&G 1993c).

The surface water stations that monitor the majority of the runoff from the Industrial Area (including some footing drain discharges) are the six NPDES stormwater monitoring locations shown in Figure 5-1 designated by "SW." (Note: SW023 is co-located with gaging station GS10.) Table 5-1 shows the total drainage area captured by each of the NPDES stations as well as the percentage of each drainage within the Industrial Area. These stations monitor runoff from all of the Industrial Area. Stations SW118 and SW022 have not been monitored since October 1992 because they were primarily used to collect data for the NPDES stormwater permit that has been completed and is currently under EPA review. Monitoring location SW027 was brought back on line in August 1993, and SW998 was brought back into operation in May 1994. Of the remaining stormwater outfalls not currently being monitored, SW022 and SW118 will be brought back into operation in 1994 as part of the event-related stormwater monitoring network. EPA has not yet determined the monitoring requirements under the forthcoming stormwater permit including sampling locations, parameters, and sampling frequency. Because the stormwater permit addresses stormwater leaving a site and the RFP permit will apply to the Industrial Area outfalls, stormwater monitoring will not be required in the interior of the Industrial Area. Thus, any stormwater monitoring needs within the Industrial Area interior must be addressed by this Industrial Area IM/IRA.

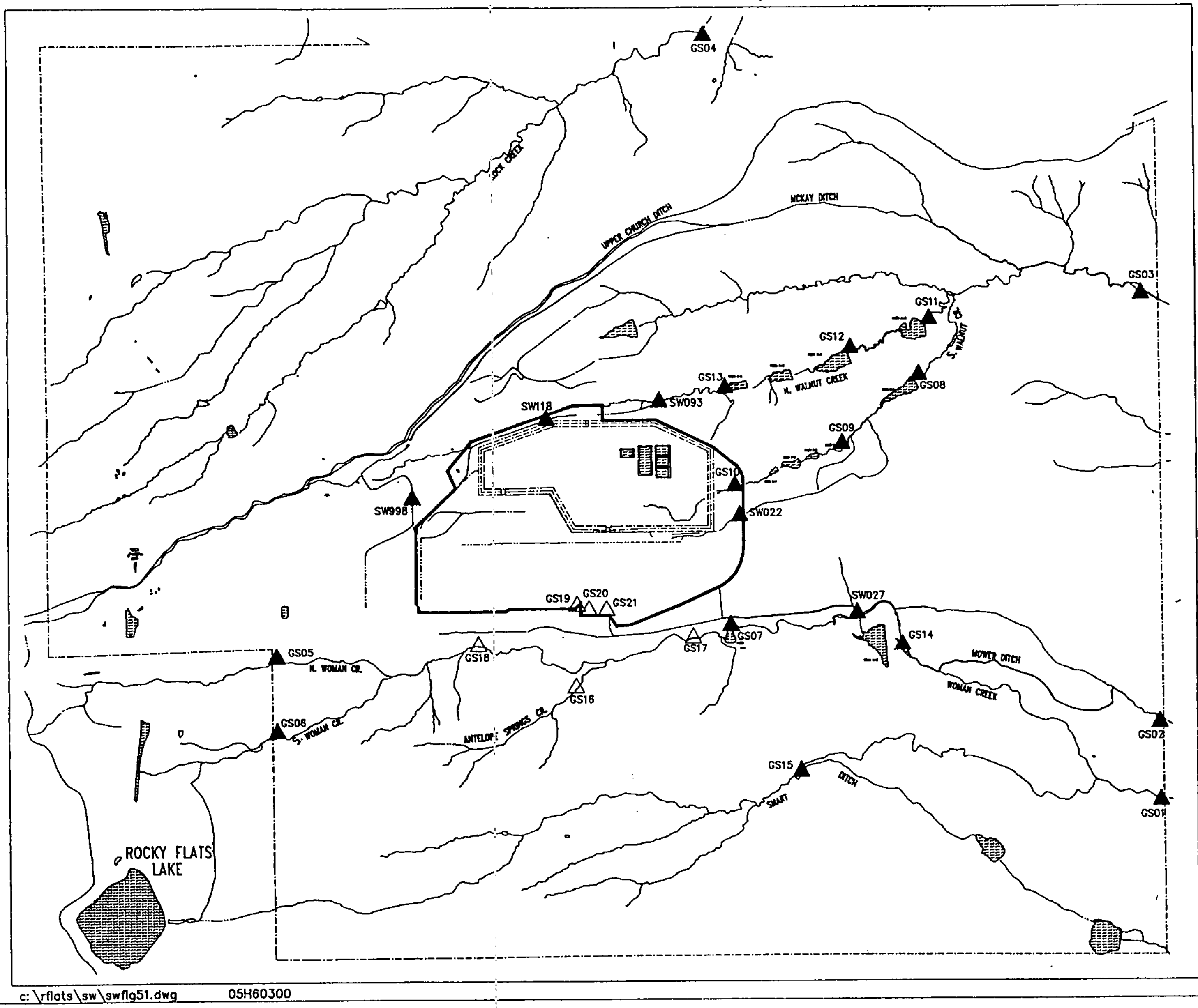
TABLE 5-1
Industrial Area IM/IRA/DD
NPDES Stormwater Monitoring Locations

Location	Description	Total Drainage Area (acres)	Industrial Area in Drainage (acres)	Percent Industrial Area in Drainage
SW022	Concrete Diversion Box at East Patrol Road	84.5	84.5	100
SW023 (GS10)	South Walnut Creek above Pond B-1 bypass	175.4	175.4	100
SW027	South Interceptor Ditch above Pond C-2	186	34	18
SW093	North Walnut Creek below Portal 3	212.3	131	~62
SW118*	North Walnut Creek above Portal 3	50.4	24.8	~49
SW998**	McKay bypass ditch below 130 complex	205	20	10

Source: Data from the *Rocky Flats Plant Drainage and Flood Control Master Plan (EG&G 1992e)*
* The location of SW118 has been represented incorrectly on many maps and consequently also on the NPDES permit application report.
** The IM/IRA drainage area differs from that shown in the NPDES Permit application.

5.2.2 Event-Related Surface Water Monitoring Program

The purpose of the Event-Related Surface Water Monitoring Program is to collect and make available data to evaluate surface water hydrology at RFP. Under the Event-Related Surface Water Monitoring Program, 21 gaging stations existed as of January 1994 and are designated by "GS" in Figure 5-1. This program differs from the NPDES program in that it is designed to collect information to improve the knowledge of the hydrologic processes at RFP, whereas the NPDES program is mostly designed to characterize surface water quality at selected sites for permitting purposes.



U.S. Department of Energy

Rocky Flats Plant

▲ GAGING AND SAMPLING STATIONS : Aug 1993

△ STATIONS ADDED IN 1993

SECURITY FENCE

STREAMS, DITCHES, DRAINAGE FEATURES

INDUSTRIAL AREA

N

FEET

0 1750 3500

FIGURE 5-1
INDUSTRIAL AREA IM/IRA/DD

Gaging Stations and Stormwater Monitoring Locations

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

(intentionally blank)

This network has evolved since 1989, and nev
monitoring and sampling equipment as funding
only GS01 to GS13 are intended by EG&G to
GS20, and GS21 are temporary and will be del
because there is no long-term regulatory require
This network is currently administered by USG
collection is coordinated by EG&G Surface Wate
at the stations is monitored continuously. Wa
increases in stream stage trigger automatic samp
stations were set to collect water-quality samples
to capture each runoff event. Samples were ana
D of Appendix 5.1.

In January of 1994, USGS submitted a draft imp
monitoring under the event-related program. In
gaging stations GS01 through GS18, SW022,
Water-quality samples would be collected seaso
spring runoff event, summer thunderstorm run
Parameters to be measured are those summarize

5.2.3 Waste Water Treatment Plant Monitorin

In addition to the stormwater and event-related m
influent to the WWTP is currently monitored for
permit and for other parameters to meet the re
Table C in Appendix 5.1) Respirometry metho
contaminants that inhibit the function of organis
of the WWTP. The respirometer measures
generated by microbiological activity. A progra
sample to be taken once per shift for respiromet

specifically require respirometry for influent monitoring, but it will continue as a Best Management Practice. Additional monitoring requirements proposed for the flow equalization basins upgradient of the WWTP include pH, conductivity, Microtox™, and lower explosive limit (LEL) (e.g., for methane). Toxicity testing/monitoring using a Microtox™ instrument has also been used on a limited basis when a potential upset or contaminant was suspected; however, this monitoring is not required by any regulation or agreement. Microtox™ testing is used only as a characterization tool to determine whether additional chemical testing is needed because Microtox™ testing is not yet sufficiently reliable (EG&G 1993b).

5.2.4 Telemetry Monitoring Capabilities

The Surface Water Division is currently working toward developing a permanent, automated, fixed-station monitoring network to collect information for regulatory compliance and overall RFP surface water management. A remote surface water monitoring system that employs radio-based telemetry hardware, computer control software, and partial real-time monitoring capabilities is being developed as part of the overall surface water monitoring program. The use of a telemetry system enables remote monitoring as stream stage changes occur and then the storage and statistical analysis of related data. This kind of system also enables remote operation of devices such as flow meters and automatic samplers (EG&G 1993d,e).

Current measurement capabilities of the radio-based telemetry system include hydrologic parameters such as precipitation, discharge, stage (water level) and, at selected locations, water-quality parameters including pH, temperature, dissolved oxygen, specific conductance, redox, salinity, and turbidity. Currently, 12 stations that measure flow and water levels are tied to the radiotelemetry network. The units are set up at the following locations: GS027, GS11, GS12, GS13, GS14, GS16, GS09, Pond B-3, Pond C-2 Dam, Pond B-5, GS01, and RPT-2. USGS is in the process of upgrading flow control structures located at each of the gaging stations to more accurately translate stage measurements to flow.

Suspended particle counters (which measure particles in the 1 to 150 micron range) have been used and evaluated at the drinking water treatment plant (Building 124) and at the OU2 Interim Measure Treatment Facility. These suspended particle counters are portable units that can be connected to the radiotelemetry monitoring system. Particle counters help identify particulate movement and are important because transuranic radionuclides such as plutonium are transported on particulates (EG&G 1993f).

The radio-based system is in a developmental phase and has the capability to be expanded to include additional stations as well as more complex instrumentation. The remote units could additionally be capable of certain control functions, such as valve or pump operation. As a system safeguard, there are multiple data backup stations, located on the measurement units and at the central computer workstation. The emphasis in the development of this system is to ensure its reliability and the repeatability of the data measurements. To achieve this quality, system maintenance occurs on a frequent basis and includes examination and calibration of field instruments (EG&G 1993e). Monitoring alternatives are further discussed in Section 5.6.

5.2.5 Summary of Existing Monitoring Programs

As of January 1994, surface water monitoring at RFP included the following framework:

- Compliance and operational monitoring of the A-, B-, and C-series ponds and the WWTP (Appendix 5.1, Tables A through C);

- Incidental water monitoring, sampling, and analysis of various surface waters in valve vaults, excavations, berms, and secondary containment structures to determine disposition for treatment and discharge (discussed in detail in Section 7.0);

- Monitoring at the 21 gaging stations that are part of the ongoing Event-Related Surface Water Monitoring Program; and

- Monitoring at NPDES stormwater outfalls SW998, SW093, SW027, and SW023 (co-located with GS10 of the ongoing event-related program).

Anticipated changes to the monitoring scheme over the next one to two years are as follows:

- All remaining NPDES stormwater stations not currently operating will be upgraded and brought back into operation.

- Gaging stations GS19, GS20, and GS21 will be removed from the Event-Related Surface Water Monitoring Program. Stations GS14 through GS18 will monitor flow and precipitation only, with no automatic sampling. The remaining stations will be equipped with automated flow measurement devices and automatic samplers as well as telemetry capabilities to provide real-time monitoring of basic hydrologic parameters such as stage, discharge, and precipitation.

- The USGS will collect, at a minimum, seasonal water quality samples at all active monitoring stations. These samples will be analyzed for the parameters listed in Table D of Appendix 5.1.

Section 5.5 of this report evaluates the existing programs in terms of their ability to meet the objectives of this IM/IRA.

5.3 SUMMARY OF AVAILABLE DATA

After review of the documents identified in Section 5.1, it was determined that two general categories of surface water documents or data were available: those addressing base flow conditions and those addressing storm flow conditions. Because the data for stormwater generally are more comprehensive, recent, and usable, the discussion of storm flow is more data-specific than the base flow discussion; however, both data sets are useful for identifying potential source areas and contaminants of concern in the Industrial Area.

The following sections discuss base flow and storm flow conditions relevant to the Industrial Area and identify potential point source areas and contaminants of concern as identified in previous reports.

5.3.1 Base Flow Document Review

The EG&G Surface Water Division's Surface-Water and Sediment Geochemical Characterization Reports for 1989 and 1990 (EG&G 1992b,c) were found to contain the most accurate and readily accessible base flow data pertinent to the Industrial Area. (Although base flow data were collected in 1991 and 1992, these data have not been statistically analyzed or compiled into a report.) These reports provide analysis and interpretation of surface water and sediment quality at RFP to provide a plant-wide overview of contaminants in these media. In addition, the significance and impacts of past and potential future contaminant releases to and transport via the surface water pathway were assessed. The following are specific report objectives for base flow relevant to proposed verification monitoring:

- Provide support for the characterization of background surface water.
- Determine average conditions and summary statistics.

- Assess time trends and seasonality.
- Evaluate spatial patterns.
- Assess relationships between surface water quality and flow.
- Delineate potential contaminant source areas.

Variables monitored during this program included VOCs, SVOCs, and pesticides/PCBs included on the CLP TCL; metals on the CLP inorganic TAL plus lithium, strontium, and tin; radionuclides; water quality indicator variables; and field variables prescribed by DOE, EPA, and CDH. In addition, surface water stage and flow data were recorded during collection of some water or sediment samples.

5.3.2 Summary of Base Flow Data

Major conclusions of each year's findings, application of findings to the Industrial Area, and comparison to other selected documents follow.

The 1989 Study. During the 1989 study, 73 surface water stations and 25 sediment stations were sampled. Of these stations, 25 are of particular interest to the Industrial Area as shown on Plate 5-1. They include 903 Pad area (SW050, SW053, SW055, SW058, SW065, SW077), the Solar Ponds area (SW084 to 090, SW092 to SW095, SW105, SW106), and Upper South Walnut Creek (SW022, SW023, SW056, SW060, SW061/SED011, SW101) (EG&G 1992c).

Surface water stations were sampled on a monthly basis with a few exceptions. Semivolatile and pesticide/PCB analyses were conducted only on a semiannual basis at all nonbackground surface water stations. In addition, volatiles, semivolatiles, and pesticides/PCBs were not monitored at the nine background surface water stations. Statistical results for selected 1989 sampling activities are contained in Table 5-2.

TABLE 5-2

Industrial Area IM/IRA/DD

1989 Surface Water and Sediment Geochemical Characterization Report Results

Selected water quality parameters, metals, organics, and radionuclides at selected locations in the Industrial Area.

PARAMETER	Solar Ponds Average	Solar Ponds Maximum	Solar Ponds Standard Deviation	Solar Ponds Sample Size	903 Pad Average	903 Pad Maximum	903 Pad Standard Deviation	903 Pad Sample Size	Upper South Walnut Creek Average	Upper South Walnut Creek Maximum	Upper South Walnut Creek Standard Deviation	Upper South Walnut Creek Sample Size
WATER QUALITY (mg/L)												
Specific Conductivity (µmhos/cm)	4,504	37,120	5,104	122	894	1,518	277	31	740	1,428	370	48
Dissolved Oxygen	4.99	23.00	3.23	122	2.39	10.10	2.31	31	6.60	70.00	9.82	48
Field pH	7.5	10.2	0.7	122	7.4	9.6	0.7	31	7.5	8.5	0.7	48
Total Dissolved Solids	5,104.5	41,000.0	7,567.9	119	496.2	790.0	140.0	34	422.0	3,300.0	451.6	51
Bicarbonate	325.5	1,000.0	176.3	119	390.1	710.0	141.7	34	283.4	540.0	159.8	51
Chloride	132.6	960.0	170.9	119	50.6	170.0	26.4	34	36.4	81.0	19.8	51
Nitrate	2,136.4	18,593.4	2,969.0	119	13.7	106.2	21.6	25	12.8	24.8	7.5	35
Nitrate/Nitrite	658.8	9,900.0	1,224.9	119	3.4	24.0	4.6	34	3.0	5.6	1.7	51
Sulfate	186.0	1,400.0	200.1	119	59.6	120.0	29.9	34	42.9	74.0	17.1	51
DISSOLVED METALS (mg/L)												
Aluminum	0.185	2.360	0.265	82								
Antimony	0.035	0.250	0.028	88	0.045	0.250	0.049	27				
Barium	0.127	0.725	0.093	91	0.203	0.343	0.076	27	0.136	0.244	0.499	33
Beryllium									0.002	0.005	0.001	29
Cadmium	0.005	0.048	0.007	86								
Calcium	227.80	1,490.00	248.57	91	110.80	145.00	22.84	27	83.81	133.00	37.75	33
Chromium	0.006	0.032	0.005	84								
Copper	0.019	0.091	0.017	80					0.013	0.029	0.003	27
Iron	0.253	9.860	1.123	86	0.735	8.540	1.819	27				
Lead	0.004	0.025	0.004	74								
Lithium	2.46	85.20	12.65	88								
Magnesium	57.62	390.00	62.20	91	18.86	30.50	7.40	27	15.98	29.10	7.18	33
Manganese	0.121	1.030	0.217	91	0.209	0.587	0.192	26	0.109	0.701	0.210	33
Mercury	0.000	0.002	0.000	86								
Molybdenum	0.048	0.250	0.026	91								
Nickel	0.022	0.087	0.010	87								
Potassium	162.37	3,330.00	439.52	89	3.36	16.00	3.10	25	2.21	2.50	0.60	29
Selenium	0.006	0.037	0.006	89	0.003	0.013	0.003	19				
Sodium	525.96	7,560.00	1,008.26	91	32.97	88.50	22.98	27	32.02	60.00	15.03	33
Strontium	1.78	11.90	1.81	88					0.52	1.17	0.19	31
Zinc	0.176	4.240	0.618	89	0.337	1.800	0.522	24	0.130	0.626	0.142	31
TOTAL RADIONUCLIDES (pCi/L)												
Americium-241	1.890	90.010	11.050	68	5.460	33.000	9.907	17	0.120	1.300	0.253	30
Cesium-137	0.114	4.700	0.693	76								
Gross alpha	197.49	1,398.00	284.26	70	67.37	350.00	98.79	17	66.35	780.00	152.72	31
Gross beta	240.71	2,500.00	373.00	70	17.71	65.00	14.48	17	51.36	570.00	116.98	31
Plutonium-239	2.433	120.000	14.465	73	16.995	110.000	30.240	17	0.397	3.300	0.876	32
Radium-226	1.615	20.000	3.640	59					1.922	7.200	2.260	18
Strontium-90	0.350	3.200	0.604	76					0.193	2.200	0.499	32
Tritium	2,000.77	13,000.00	2,406.80	78					100.63	500.00	196.76	32
Uranium, Total	127.58	1,023.00	189.50	49	7.40	18.10	5.70	11	5.65	16.60	3.37	25
Uranium-233, -234	101.23	860.80	170.50	76	3.47	10.00	2.56	17	2.92	7.70	1.70	32
Uranium-235	4.34	65.50	9.91	76	0.16	0.70	0.19	17	0.17	1.00	0.19	32
Uranium-238	54.33	366.00	77.59	76	2.93	7.80	2.15	17	2.52	7.90	1.42	32
DISSOLVED RADIONUCLIDES (pCi/L)												
Americium-241	0.036	0.640	0.147	19								
Cesium-137	0.042	0.900	0.364	19					0.000	0.600	0.590	6
Gross alpha	284.263	1,900.000	439.612	19	5.000	8.000	4.240	2	5.500	16.000	5.648	6
Gross beta	393.421	3,800.000	866.595	19								
Plutonium-239	0.146	2.400	0.547	19	0.100	0.200	0.141	2				
Uranium-235	3.126	12.000	3.364	19								
Uranium-238	48.226	130.000	45.073	19								
VOLATILE ORGANICS (µg/L)												
1,1-Dichloroethane									4.689	50.000	8.030	37
1,2- Dichloroethylene	3.549	15.000	2.989	81	7.200	44.000	11.929	25				
Acetone	19.286	180.000	35.643	56					12.897	130.000	25.540	29
Carbon Disulfide	3.617	19.000	3.256	77								
Carbon tetrachloride	8.179	100.000	15.843	81	4.520	46.000	8.772	25	46.861	430.000	95.466	36
Chloroform	3.512	12.500	2.880	81	2.940	8.000	1.294	25	18.417	82.000	23.630	36
Ethylbenzene	3.432	12.500	2.704	81								
Methylene Chloride	4.540	12.500	3.608	47	2.825	9.000	1.453	20	3.280	11.000	2.020	25
Tetrachloroethene					3.920	19.000	4.185	25	53.095	280.000	83.694	37
Trichloroethene	3.406	12.500	2.750	80	10.940	65.000	15.780	25	41.040	260.000	62.500	37
Vinyl chloride									7.135	25.000	5.056	37
SEMIVOLATILE ORGANICS (µg/L)												
Bis[2-ethylhexyl]-phthalate	7.385	32.000	8.968	13	(None Detected)				(None Detected)			

Source: (EG&G 1992b). Adapted from 1989 Surface-Water And Sediment Geochemical Characterization Report. Final. April, 1, 1992.

Average values represent the sum of the concentrations divided by the number of analyses for that analyte. If an analyte was not detected in a sample, one-half of the detection limit was used for the average calculation.

NOTES:

mg/L = milligrams per liter
pCi/L = picoCuries per liter
µg/L = micrograms per liter
µmhos/cm = micromhos per centimeter

The 1990 Study. The major emphasis of the 1990 study (EG&G 1992c) was the identification of trends and processes affecting the nature and extent of contaminants in surface water and sediment. Surface water data that were used in the report were retrieved from RFEDS for 98 of the sampling locations shown on Plate 5-1. After verification of data, statistical and qualitative analyses were performed for the following purposes: characterization of major ion chemistry, identification of areal trends for selected constituents, determination of differences in constituent concentrations between background stations and downstream stations, and investigation of geochemical trends and relationships.

The only organic constituents examined in this report were trichloroethene (TCE), carbon tetrachloride (CCl_4), and toluene. These constituents that were widely used in past RFP operations were selected because they were believed to be indicative of VOC contamination at RFP. Organic contaminants were found in selected bottom sediment samples, but the number of sediment samples acquired in 1990 was too few to statistically summarize. Radionuclide characterization involved evaluating activities of gross alpha, gross beta, uranium-235, uranium-236, plutonium-239, plutonium-240, and americium-241. Radiochemical data were missing at many stations; thus, conclusions could only be drawn with regard to radionuclide contamination at the Solar Ponds, and these conclusions were considered to be preliminary. Throughout the plant, total chromium, lead, and mercury concentrations were near analytical detection limits.

General results of statistical analyses showed statistically significant differences from background concentrations/activities in each of the drainages at RFP. In addition, although several operations affect water quality at the site, the most serious source of contamination was identified as the Solar Ponds. The results also indicated that contaminants including radionuclides might be transported from the old landfill, the 903 Pad, and the Lip Area to the SID. The most contaminated surface waters investigated were in the Solar Ponds sumps and seeps. The seeps in OU2 (the 903 Pad and Mound areas) were the second most contaminated surface waters.

In Conclusion. Based on the data collected and evaluated in the 1989 and 1990 Surface Water and Sediment Geochemical Characterization reports (EG&G 1992b,c), areas of surface water contamination within the Industrial Area include the Solar Ponds area (OU4), the 903 Pad area (OU2), and Upper South Walnut Creek near the northeastern Industrial Area boundary (Mound area, OU2). In the Solar Ponds area, elevated water quality parameters and chemical constituents included specific conductivity, pH, chloride, sulfate, nitrite/nitrate, various metals, a variety of radionuclides, VOCs, and SVOCs, as well as one PCB detection. In the 903 Pad area, radionuclides, VOCs, and a few metals were elevated. In the Upper South Walnut Creek area, metals, plutonium, and VOC levels were elevated. Radionuclides and organics of concern in these areas are shown in Table 5-3. In most cases, the highest levels of contamination were found in seeps, and in the case of the Solar Ponds, in the sumps, seeps, and interceptor trench system (ITS).

A surface water IM/IRA is being implemented at OU2, which includes the 903 Pad and Mound areas and is based in part on the data collected during 1989 and 1990 for the Surface Water and Sediment Geochemical Characterization reports. The OU2 IM/IRA treats surface water contamination consisting primarily of TCE, PCE, CCl_4 and associated degradation products. Several metals, uranium, and other inorganic constituents were also noted to be above background in environmental media, but no strong conclusions were drawn regarding these constituents, and they were designated to be investigated in the context of long-term remediation. South Walnut Creek Basin surface water in the Mound area, as characterized by data for stations SW056, SW059, SW060, SW061, and SW101, showed CCl_4, TCE, and PCE in concentrations in excess of 200 μg/L, with lower and infrequent concentrations of 1,1-dichloroethene (1,1-DCE), 1,1-dichloroethane (1,1-DCA), 1,2-dichloroethene (1,2-DCE), vinyl chloride, acetone,

TABLE 5-3
Industrial Area IM/IRA/DD
Primary Organic and Radionuclide Contaminants at Selected Areas in the Industrial Area Identified in the 1989 and 1990 Surface Water and Sediment Geochemical Reports

	Solar Ponds	903 Pad	Upper S. Walnut Creek (Mound Area)
ORGANICS			
Acetone	X		X
Bis [2-Ethylhexyl]-Phthalate	X		
Carbon Tetrachloride	XX	XX	XX
Chloroform	X	X	X
1,2-Dichloroethylene	X	XX	
Methylene Chloride	X		X
PCE		X	XX
TCE		XX	XX
PCBs (Aroclor-1254)	X		
RADIONUCLIDES			
Americium-241	XX	XX	
Gross Alpha	XX	XX	XX
Gross Beta	XX	XX	XX
Plutonium-239	XX	XX	
Tritium	XX		
Uranium-233,234	XX		
Uranium-235, 236	XX		
Uranium-238	XX		
Total Uranium	XX		

Note:
PCB = polychlorinated biphenyl
PCE = tetrachloroethene
TCE = trichloroethene
XX = widespread contaminant
X = contaminant detected at individual monitoring location, but not widespread

bromodichloromethane, and methylene chloride. These stations also frequently showed high surface water concentrations for total dissolved solids (TDS) and uranium. Seeps in the vicinity of the 903 Pad Lip Site (SW050, SW053, SW054) had detectable plutonium and/or americium during one or more sampling events in 1989. The source of these radionuclides was theorized to be contaminated soils (DOE 1992a; EG&G 1991).

Historically, surface water collected for the OU2 IM/IRA surface water program was treated. This included surface water from sample locations SW059, SW061, and SW132. Monitoring for SW061 and SW132 have since been eliminated under OU2. SW059, which is associated with an active seep/spring in the South Walnut Creek Basin, is still a current monitoring site. SW061 was located at the outlet of a concrete culvert. SW132 was located at a buried corrugated metal culvert approximately 225 feet downgradient of SW061. The surface water sample that was collected at SW061 and SW132 (and is currently being collected at SW059) was located upstream of the B-series ponds. The purpose of the upstream location was to reduce the potential of further downstream contamination. A treatment system consisting of a chemical precipitation/cross-flow membrane filtration system was installed by OU2 to remove heavy metals, radionuclides, and VOCs from the seeps (DOE 1992a).

OU4, which encompasses the Solar Ponds, is currently undergoing the Phase II RCRA facility investigation/remedial investigation (RFI/RI) process and has a collection and treatment system in place for waters contaminated with heavy metals, radionuclides, and nitrates (DOE 1992a). A preliminary analysis shows that the ITS, established in 1980-81, effectively collects alluvial groundwater and seeps (and significant quantities of stormwater runoff) in areas where the system is keyed into bedrock. This system does not effectively collect alluvial groundwater where the ITS is not keyed into bedrock, particularly to the east-northeast of the Solar Ponds where a nitrate-contaminated plume is believed to exist. In addition, the west collector, which contains high levels of VOCs, is no longer hydraulically connected to the ITS. Noting these two exceptions, collected water is transferred to temporary modular storage tanks (TMSTs) located northwest of the Solar Ponds (as of April 1993) and eventually transferred to flash evaporators in Building 910 or the Building 374 process waste treatment system for treatment.

Finally, it is necessary to note that, based on the Surface Water and Sediment Geochemical reports (EG&G 1992b,c), there are limited data with regard to the western and south central portions of the Industrial Area. In addition, efforts to backtrack water quality in the Upper SID to sources in the western Industrial Area were not successful because of limited data and multiple contamination sources to the SID. According to the 1989 report (EG&G 1992b), it is possible that IHSSs in the western Industrial Area may contribute to elevated levels of sulfate, radionuclides, and some metals in the upper SID. The 1990 report (EG&G 1992c) noted gross alpha, gross beta, plutonium-239, uranium, nitrite/nitrate, and total suspended solids (TSS) elevated above background, but it did not identify any probable contamination source in the western or south central Industrial Area; instead, it focused on the old landfill, the 881 Hillside area, and the americium zone as potential contamination sources. The americium zone is the area southeast (downwind) of the 903 Pad. Americium is thought to be present in this area because plutonium from the 903 Pad, which was transported by the wind, has partially decayed to produce americium.

5.3.3 Stormwater Document Review

The most recent and complete data regarding stormwater are contained in two reports titled *Event-Related Surface-Water Monitoring Report, Rocky Flats Plant: Water Years 1991 and 1992* (EG&G 1993a) and *Stormwater NPDES Permit - Application Monitoring Program, Rocky Flats Plant Site* (EG&G 1993c). Additional data are contained within the NPDES Permit Application (DOE 1992c) submitted to EPA in October 1992, and the *Draft Surface Water Management Plan (SWMP)* (EG&G 1992a). Table 5-4 displays parameters analyzed or reported in each of the studies or sampling efforts.

TABLE 5-4
Industrial Area IM/IRA/DD
Parameters Reported in Relevant Storm Water Documents

Parameter	NPDES Storm Water Report Parameters Tested (1)	Event-Related Report Parameters Tested (2)	NPDES Individual Permit 10/92 Parameters Tested (3)	SWMP 1990-1991 Data (4)
Dissolved Oxygen				X
Fecal Coliforms				X
Nitrite				
Nitrate				
Residual Chlorine				
Free Cyanide				
Sulfide (Hydrogen sulfide)				X
Boron				
Americium		X		X
Cesium 134		X		
Gross Alpha		X		X
Gross Beta		X		X
Plutonium		X		X
Radium 226 and 228		X		X
Strontium 90		X		
Thorium 230 and 232		X		
Tritium		X		X
Uranium		X		X
Aluminium	X	X	X	
Antimony	X	X	X	X
Arsenic	X	X	X	X
Barium	X	X	X	X
Beryllium	X	X	X	X
Cadmium	X	X	X	X
Chromium	X	X	X	X
Cobalt	X	X	X	X
Copper	X	X	X	X
Iron	X	X	X	X
Lead	X	X	X	X
Manganese	X	X	X	X
Mercury	X	X	X	X
Molybdenum	X	X	X	X
Nickel	X	X	X	X
Selenium	X	X	X	X
Silver	X	X	X	X
Strontium	X	X	X	X
Thallium	X	X	X	X
Vanadium	X	X	X	X
Zinc	X	X	X	X
Calcium	X	X		X
Magnesium	X	X		X
Potassium	X	X		X
Sodium	X	X		X
	X			
Alkalinity			X	X
Sulfate	X		X	X
Chloride	X		X	X
Fluoride	X		X	X
pH	X		X	X
Specific Conductance	X			
Dissolved Solids	X		X	X
Total Suspended Solids	X		X	X
Ammonia as N	X			X
Nitrate/Nitrite as N	X		X	
Total Phosphorus as P	X		X	X
Organics		X	X	X

(1) = *Stormwater NPDES Permit-Application Monitoring Program, Rocky Flats Plant Site* (EG&G 1993c)
(2) = *Event-Related Surface Water Monitoring Report for the Rocky Flats Plant for Water Years 1991 and 1992* (EG&G 1993a)
(3) = NPDES Permit Application submitted 10/92 (DOE 1992c)
(4) = *Draft Surface Water Management Plan [SWMP]* (EG&G 1992a)

It is difficult to quantitatively compare the results from the individual sampling programs because of differences in constituents analyzed, as well as differences in analytical methods, laboratories, detection limits, and sampling methodologies. In addition, the latter two reports, although informative, do not significantly add to an understanding of available stormwater data; thus, the first two reports are referenced to identify the areas and contaminants of concern relevant to stormwater in the Industrial Area.

5.3.4 Summary of Stormwater Data

The *Event-Related Surface-Water Monitoring Report, Rocky Flats Plant: Water Years 1991 and 1992* (EG&G 1993a) evaluated surface water hydrology data collected at 12 gaging stations that are part of the RFP Gaging Station and Stormwater Monitoring Network (Figure 5-1, as discussed in Section 5.2). Two stations are of particular interest because of their proximity to the Industrial Area; they are GS13 (co-located with SW092) and GS10 (co-located with SW023). GS13 captures runoff directly from the northeast corner of the Industrial Area. This sampling location is diluted with upstream flow from North Walnut Creek and significant runoff flows from the Building 371 and 700 area. GS10, located at the eastern boundary of the Industrial Area, drains a much larger portion of the Industrial Area and is less likely to be diluted by non-Industrial Area waters. Metal and radionuclide data collected at these two stations are summarized in Table 5-5. Metal concentrations between the two stations do not appear to differ significantly. Except for uranium-235 and uranium-238, radionuclide concentrations were greater at GS10 than at GS13.

Because of the limited quantity of data, analyte concentrations near the analytical detection limit, and questionable discharge data quality, the following general conclusions were made at the end of the report based on observation of trends in the data collected at the 12 gaging stations rather than extensive statistical analysis:

TABLE 5-5
Industrial Area IM/IRA/DD
Mean Concentration of Constituents in Stormwater Collected at GS10 and GS13

Metals (µg/ml)	GS10 Mean	Standard Deviation	GS13 Mean	Standard Deviation
Aluminum	11100	6510	12400	12200
Antimony	20.4	7.01	24.4	11.8
Arsenic	2.89	1.47	2.04	1.26
Barium	143	75.4	150	66.1
Beryllium	1.08	0.63	1.10	0.74
Cadmium	2.68	0.69	3.37	0.84
Calcium	38200	13900	42300	17700
Cesium	393	186	377	210
Chromium	13.8	7.24	12.9	10.9
Cobalt	4.83	2.59	5.72	2.90
Copper	27.3	19.4	15.9	10.8
Iron	3710	3130	3320	2370
Lead	24.3	13.9	14.7	14.1
Lithium	10.5	4.39	13.4	5.56
Magnesium	8970	3780	15800	16100
Manganese	258	230	290	271
Mercury	0.88	2.03	0.30	0.27
Molybdenum	9.27	7.85	13.6	8.42
Nickel	365	1170	13.6	7.43
Potassium	5900	6110	4820	1800
Selenium	1.37	1.29	2.10	1.24
Silicon	21100	10000	16000	18100
Silver	3.78	2.27	5.30	2.27
Sodium	19300	7430	27500	10600
Strontium	234	99.3	262	114
Thallium	1.78	0.54	2.10	0.33
Tin	29.3	52.1	37.6	55.4
Vanadium	27.5	18.4	28.9	26.3
Zinc	312	279	124	102
Radionuclides (pCi/L)				
Plutonium-239	0.183	0.202	0.038	0.024
Americium-241	0.115	0.142	0.070	0.055
Uranium-235	0.079	0.081	0.129	0.118
Uranium-238	1.007	0.537	2.004	1.333

Notes: Values calculated from data presented in the *Event-Related Surface-Water Monitoring Report for the Water Years 1991 and 1992* (EG&G 1993a). If an analyte was not detected in a sample, the detection limit was used for statistical calculations.

pCi/L = picocuries per liter; µg/mL = micrograms per milliliter

1. Total metal and radionuclide loads in Walnut Creek appeared to be higher than overall constituent loads in other RFP drainages because of runoff from impervious areas within the Industrial Area of the plant. This conclusion was made without statistical verification because of limited data quantity (EG&G 1993a).

2. Total metal and radionuclide loads measured at gaging stations upstream from the RFP A- and B-series detention ponds appeared to be higher than overall constituent loads measured at gaging stations downstream from the detention ponds. This measurement indicates the removal of constituents from the water column in the ponds (EG&G 1993a).

3. Plutonium-239/240 activity increased with increasing aluminum and iron concentrations in the Walnut Creek drainage, indicating that the plutonium was associated with iron-coated or iron-containing aluminosilicates in transported suspended sediment (EG&G 1993a).

4. Uranium-238 activity and major cation concentrations decreased with increasing stream discharge at station GS13 on North Walnut Creek, indicating dilution of these constituents, which were likely transported from natural sources. Trace metal concentrations increase with increasing stream discharge at GS13, indicating flushing of metals from impervious portions of the Core area or from wetland areas that might attenuate metal transport (EG&G 1993a).

5. Americium-241 activity decreased with increasing stream discharge at station GS10 in South Walnut Creek, indicating dilution of an americium-241 source at high flow (EG&G 1993a).

6. Major cation and trace metal loads were within the same order of magnitude in each RFP drainage, indicating no significant anthropogenic source of metal constituent loading to RFP streams. However, this conclusion was based on observation of only selected metal loads, which were calculated based on data obtained from analytical methods that may not have adequate sensitivity (EG&G 1993a).

7. Pesticides and SVOCs were monitored during two storm events; no compounds were detected at detection limits that ranged from 10 to 50 μg/L.

The second report, *Stormwater NPDES Permit—Application Monitoring Program, Rocky Flats Plant Site* (EG&G 1993c), provides data on precipitation, hydrologic parameters including mean daily discharge and event-specific discharge, and water quality for the six NPDES monitoring stations located in the main channels that drain the RFP Industrial Area. Sample locations included in the program were SW022, SW023, SW027, SW093, SW118, and SW998 (Figure 5-1). The report describes the comprehensive results of the monitoring program including water quality data and stream flow records of stormwater events.

A total of 116 surface water samples and 19 bulk-precipitation samples were collected and analyzed during a 15-month period from October 1991 through December 1992 during 32 storm or high-flow events. Chemical analyses were performed for surface water samples for selected trace metals, anions, and nutrient species. Sampling activities included first-flush and hydrograph-integrated flows.

Table 5-6 summarizes the first-flush sampling data. The first-flush sampling was accomplished by collecting samples from the beginning of the storm runoff at 1.5-minute intervals until the stream channel stage declined below a preset level, or alternatively, all sample bottles were filled. These samples provided a characterization of the "first

TABLE 5-6
Industrial Area IM/IRA/DD
First-Flush Storm Water Quality Data from November 1991 to August 1992

Parameter	Maximum Value SW022	Average Value SW022	Maximum Value SW023	Average Value SW023	Maximum Value SW093	Average Value SW093	Maximum Value SW118	Average Value SW118	Maximum Value SW027	Average Value SW027	Maximum Value SW998	Average Value SW998
METALS (µg/L) (1)												
Aluminum	59,900	22,245	26,400	10,770	39,400	16,264	113,000	24,793	7,370	2,241	N/A	N/A
Antimony	56.8	24.6	44.8	16	19.9	12.2	76.6	24.8	24.9	16.7	N/A	N/A
Arsenic	37.5	18.6	70.5	30	37.5	28.1	79.2	40.1	37.5	28.3	N/A	N/A
Arsenic (2)	3.6	2.63	17.8	6.4	26.1	9.62	11.6	4.28	2.6	1.15	N/A	N/A
Barium	317	160	318	163	298	174	663	223	116	103	N/A	N/A
Beryllium	2.4	1.28	1.7	0.58	1.5	0.82	3.3	1.09	0.5	0.45	N/A	N/A
Cadmium	6.6	2.8	5.9	2.29	4.6	2.31	2	1.46	8.7	3.56	N/A	N/A
Chromium	86.3	32.5	37.3	19.3	49.9	21.5	105	27.3	10.7	4.81	N/A	N/A
Cobalt	21.3	8.98	12.4	5.67	14.7	8.98	31.3	8.61	3.5	2.9	N/A	N/A
Copper	78	36.6	64.9	33.3	44.8	28.6	94.3	25.8	9.4	4.48	N/A	N/A
Iron	60,800	23,433	27,300	12,541	34,500	16,248	90,500	22,191	6,160	1,915	N/A	N/A
Lead	141	66.9	76.4	37.9	63.8	30.4	45	29.7	27	20.5	N/A	N/A
Lead (2)	560	44.2	149	39	97	52.8	74.9	17.4	2.9	1.55	N/A	N/A
Manganese	0.1	292	3,370	648	1420	576	1820	554	78.2	33.1	N/A	N/A
Mercury (3)	6	0.1	0.1	0.1	0.21	0.12	0.23	0.12	0.1	0.1	N/A	N/A
Molybdenum	51.9	4.18	6	4.78	6	5.32	7	5.52	6	5.4	N/A	N/A
Nickel	31	25.3	34.5	12.3	32.2	16.1	6.95	24.6	9.5	8.36	N/A	N/A
Selenium	31	22.7	40	19.5	31	22.4	40	24.7	31	23.5	N/A	N/A
Selenium (2)	1	0.77	3.1	1.16	1.7	1.04	2	1.15	1.9	0.85	N/A	N/A
Silver	3.5	2.43	35	3.96	2.5	2	7	3.4	2.5	2.13	N/A	N/A
Strontium	201	133	403	221	158	121	461	261	395	298	N/A	N/A
Thallium	144	53	288	64.5	66.5	49.3	288	97.9	148	70.4	N/A	N/A
Thallium (2)	0.5	0.5	2.3	0.7	3	1.16	5.5	1.43	0.5	0.5	N/A	N/A
Vanadium	142	55.3	63.6	29.3	88.8	40.8	235	56.1	19.5	8.38	N/A	N/A
Zinc	444	234	1,020	490	594	304	566	187	66.7	34.9	N/A	N/A
INORGANICS (mg/L)												
Calcium	44.3	30.8	70.5	41.1	32.8	22.3	65.9	36.6	64.8	49.6	N/A	N/A
Magnesium	13.2	7.27	18.1	9.06	8.85	6.36	30.2	12.9	13.5	10.3	N/A	N/A
Potassium	11.8	6.29	38.1	7.64	7.04	4.84	16.3	5.97	6.53	4.58	N/A	N/A
Sodium	47	17.2	136	27.3	18.2	11.9	153	60.8	31.9	24.8	N/A	N/A
Alkalinity	73.7	45.2	157	100	61.3	39.8	242	85	162	126	N/A	N/A
Sulfate	8	5.2	41.7	17.1	11.7	6.18	25	11.8	58	34.4	N/A	N/A
Chloride	133	29.6	303	54.1	66	23.8	292	118	69	58	N/A	N/A
Fluoride	1	0.48	10.2	0.94	0.8	0.53	1	0.43	0.38	0.27	N/A	N/A
pH	8	7.7	7.9	7.4	8	7.4	8	7.5	7.7	7.4	N/A	N/A
Specific Conductance	420	216	640	375	300	213	1300	694	700	495	N/A	N/A
Dissolved Solids	264	139	722	239	647	199	621	301	404	288	N/A	N/A
Total Suspended Solids	926	520	1,258	441	998	467	3,031	672	95	34	N/A	N/A
Ammonia as N	0.39	0.14	1.3	0.34	0.44	0.18	1.5	0.22	0.1	0.04	N/A	N/A
Nitrate/Nitrite as N	2.75	1.14	2.01	1.35	1.29	0.96	3.14	0.74	1.3	0.74	N/A	N/A
Total Phosphorus as P	1.5	0.62	2.31	0.68	2.4	0.58	1.05	0.39	0.12	0.07	N/A	N/A

NOTES:

First-flush samples were taken from beginning of the storm runoff at 1.5-minute intervals until the stream-channel stage declined below a preset level or until all 24 sample bottles were filled. Sampling data collected from October 1991 to December 1992. Data were reported in the NPDES Permit Application Monitoring Report for Rocky Flats Plant Site (EG&G 1993c). First-flush is the period during the rising limb of a hydrograph. If an analyte was not detected in a sample, one-half of the detection limit was used for the average calculation.

(1) All storm water quality metals data are total recoverable concentrations.
(2) Analytical method used was graphite furnace atomic absorption spectroscopy.
(3) Analytical method used was cold vapor atomic absorption spectroscopy.

ABBREVIATIONS:

mg/L = milligrams per liter
pCi/L = picoCuries per liter
µg/L = micrograms per liter

flush" from the drainage areas. First flush is the period that occurs during the rising limb of a runoff hydrograph (i.e., the period between when stage begins to rise and the time when stage reaches maximum elevation). Table 5-7 summarizes the hydrograph-integrated stormwater quality data for surface water stations. The integrated samples were taken from the beginning of the storm runoff at preset time intervals until the stream-channel stage declined to a preset level. Generally, these samples provided an integrated water-quality characterization over the prolonged storm-runoff/high-flow hydrograph period.

Tables 5-6 and 5-7 present maximum and average results from the NPDES monitoring during the 15-month sampling period. Maximum values are the highest concentrations reported during this period. As expected, average values represent the sum of the concentrations divided by the number of analyses for that analyte. If an analyte was not detected in a sample, one-half of the detection limit was used for the average calculation.

All of the metals reported in Tables 5-6 and 5-7 are total recoverable metal concentrations. Metals having the highest concentrations in the storm-runoff samples were consistently aluminum and iron. Anion and nutrient species concentrations at all sites were judged to be at reasonable levels associated with storm runoff. Only one storm event was successfully sampled for organics because of the timing of the storm events coupled with the standard sampling methods, which necessitate manual grab samples. (This sample result was not provided in the report, although it was included in the actual permit application.)

A comparison was made of constituent concentrations in runoff from a sampling area where a majority of the drainage (51 to 100 percent) is in the Industrial Area, such as SW022, SW023, and SW093, to constituent concentrations from a sampling area where only a portion of the drainage (8 to 9 percent) is in the Industrial Area, such as SW027, SW118, and SW998. There were no statistically significant differences.

TABLE 5-7
Industrial Area IM/IRA/DD
Hydrograph Integrated Storm Water Quality Data from November 1991 to August 1992

Parameter	Maximum Value SW022	Average Value SW022	Maximum Value SW023	Average Value SW023	Maximum Value SW093	Average Value SW093	Maximum Value SW118	Average Value SW118	Maximum Value SW027	Average Value SW027	Maximum Value SW998	Average Value SW998
METALS (µg/L) (1)												
Aluminum	24,100	5,840	38,900	11,828	34,800	13,018	78,200	22,234	20,200	4,604	11,600	5,423
Antimony	402	68.5	55.6	20.2	34.9	19	53.6	15.6	12.5	12	12.5	10
Arsenic	69	31	72	27.8	37.5	27.3	37.5	26.6	37.5	31.3	37.5	23.5
Arsenic (2)	6.5	2.71	14.9	5.6	7.2	2.9	16.9	4.28	1.9	0.82	3.9	2.2
Barium	200	79.6	282	139	225	132	509	229	179	112	62.5	38.9
Beryllium	2.2	0.79	1.5	0.58	1.5	0.7	1.8	0.78	0.5	0.47	0.5	0.43
Cadmium	7	2.65	3.7	1.83	5.6	2.54	2	1.51	2	1.93	2	1.52
Chromium	34.9	10.9	53.4	19.6	39.1	16	72.8	22.6	25.5	6.68	21.7	10.1
Cobalt	11.6	4.64	13.7	5.15	8.5	6.2	24.1	8.01	3.5	3.1	3.5	2.9
Copper	45.4	15.5	60.6	27.7	39.5	19	73	27.3	22.7	7.15	21.2	11
Iron	26,300	6,140	32,800	11,996	34,300	12,960	66,200	21,896	17,100	3,837	9,990	4,733
Lead	59.5	32.5	60.5	33.7	29	23.7	29.1	25.9	27	23.1	29	24.6
Lead (2)	32.9	12.9	82.2	33.8	36	24.6	56.2	18.1	8.2	3.52	37.3	20.6
Manganese	482	116	912	341	536	380	1870	679	155	47.2	151	66.6
Mercury (3)	0.2	0.11	0.2	0.11	0.1	0.1	0.23	0.11	0.1	0.1	0.1	0.1
Molybdenum	60.4	13	6	5.07	6	5.28	6	5.21	16.7	7.98	6	5.03
Nickel	21.3	10.8	45.5	13.4	14.1	9.51	50.9	20.6	9.5	8.74	17.5	10.7
Selenium	40	22.7	31	19.2	31	21.8	31	21	31	26	31	18.8
Selenium (2)	1.3	0.77	1.9	1.13	0.5	0.5	21	0.97	0.5	0.5	0.5	0.5
Silver	7	2.91	2.5	1.85	2.5	2	2.5	1.94	2.5	2.25	2.5	1.83
Strontium	262	136	411	190	136	104	348	253	457	268	40.6	26.2
Thallium	288	78	66.5	45.4	66.5	47.5	66.5	47.6	66.5	55.5	66.5	41.4
Thallium (2)	1	0.57	3	0.68	0.5	0.5	4.2	1.26	0.5	0.5	1.5	1
Vanadium	59.9	15.3	91.3	32.2	84.4	31.2	160	49.2	45.7	12.5	26.3	14.3
Zinc	346	103	658	342	280	203	473	188	107	41.7	221	146
INORGANICS (mg/L)												
Calcium	39.2	26.4	60.6	34.6	19.8	18.1	47.1	34.5	73.4	44.3	6.61	5.31
Magnesium	8.15	5.1	13.7	7.62	8.09	5.15	22.1	11.9	14.7	9.26	2.98	1.75
Potassium	6.8	4.58	8.09	4.81	7.21	4.36	13.2	5.75	5.65	4.1	4.18	2.54
Sodium	39.6	18.6	44.6	17.3	24.9	17.8	141	85.5	37.2	22.3	6.55	3.63
Alkalinity	142	53.5	112	78.9	54.4	43.8	86.1	61.1	156	113.3	12.2	8.6
Sulfate	25.9	6.66	38.4	14.3	11	6.72	23	12.2	63.1	24.8	4.85	3.9
Chloride	68	29.6	172	47.9	120	57.3	297	176	123	72	3.95	3.01
Fluoride	0.71	0.26	0.57	0.24	0.35	0.23	1.3	0.33	0.48	0.32	0.27	0.26
pH	8.1	7.6	8	7.5	7.9	7.3	7.9	7.4	8.1	7.8	7.6	6.9
Specific Conductance	540	216	560	311	260	203	1,040	709	770	402	100	70
Dissolved Solids	271	153	470	224	184	131	582	394	474	273	102	58
Total Suspended Solids	570	200	1,232	402	568	380	1,659	505	384	94	219	90
Ammonia as N	0.32	0.1	1.7	0.35	0.26	0.11	0.5	0.09	0.1	0.04	0.1	0.06
Nitrate/Nitrite as N	1.76	0.97	1.82	1.28	1.22	0.99	0.84	0.63	1.2	0.74	0.61	0.39
Total Phosphorus as P	0.54	0.28	1.44	0.54	1.1	0.68	0.86	0.35	0.84	0.07	0.06	0.03

NOTES:

Hydrograph events were sampled with automatic samplers at the beginning of the storm runoff at preset time intervals from initial rise in stream-channel stage until the stream-channel stage declines to a preset level. Data reported in the NPDES Permit Application Monitoring Report for Rocky Flats Plant Site (EG&G 1993c). If an analyte was not detected in a sample, one-half of the detection limit was used for the average calculation.

(1) *All storm water quality metals data are total recoverable concentrations.*
(2) Analytical method used was graphite furnace atomic absorption spectroscopy.
(3) Analytical method used was cold vapor atomic absorption spectroscopy.

ABBREVIATIONS:

mg/L = milligrams per liter
pCi/L = picoCuries per liter
µg/L = micrograms per liter

For stormwater event samples, maximum and average concentrations for many of the trace metals and major ions analyzed were higher in first-flush samples than with hydrograph-integrated samples with the exception of SW023 and SW027. When site-by-site average hydrograph integrated concentrations were compared, a varying number of relatively high concentrations were reported. More detailed conclusions as well as fairly extensive data summaries by monitoring location in both tabular and graphic form may be found in the 1993 *Stormwater NPDES Permit—Application Monitoring Program for Rocky Flats Plant Site* report (EG&G 1993c).

Correlations between water quality and stream flow were evaluated for selected storm runoff events. Variations of specific conductance as a function of discharge occasionally exhibited an erratic pattern; however, in several instances, a more normally expected dilution pattern of lower specific conductance with high discharge as well as hysteresis effects were noted. Thus, dilution and hysteresis effects are neither consistent in pattern for any given storm event at all sites nor are trends apparent on a consistent basis.

5.4 PATHWAY IDENTIFICATION

Decisions affecting the surface water monitoring plan in the Industrial Area must take into account the surface water flow pathways that drain the Industrial Area. All potential surface water pathways in the Industrial Area have been defined. These pathways are distinguished by the drainage destination associated with the surface water drainage networks, which are composed of a number of subbasins. Subbasins are topographically distinguishable areas that drain stormwater to a distinct location or locations. The flow pathways and subbasins are shown in Figure 5-2. The drainage pathways link the subbasins as they drain toward a common destination. The Industrial Area subbasins have been identified in Section VII of the *Rocky Flats Plant Drainage and Flood Control Master Plan* (EG&G 1992e). The same subbasin identification that was used in the *Drainage and Flood Control Master Plan* will also be used in this document. The *Drainage and Flood Control Master Plan* divides the Industrial Area into 29 subbasins, each of which was given a designator that begins with a "C." CWADIV2 drains to the McKay Diversion canal and is just to the west of the area shown on Figure 5-2. The letters following the "C" designate the stream to which the basin ultimately drains; "WA" indicates North Walnut Creek, and "SWA" indicates South Walnut Creek. "DIV" refers to a diversion, either the SID or the Walnut Creek Diversion.

This analysis considers only Industrial Area surface water flow pathways resulting from usual flow conditions. Pathways identified in this Decision Document (DD) may differ from the *Rocky Flats Plant Drainage and Flood Control Master Plan* (EG&G 1992e) to demonstrate typical flow conditions. Alternate pathways may occur when storm sewers and culverts are overwhelmed by excessive runoff. Also, the hydrologic condition and carrying capacity of storm sewers and culverts vary within the Industrial Area. A total of seven drainage pathways, or seven unique destinations, have been identified for runoff draining the Industrial Area under normal flow conditions. These drainage paths link subbasins, which drain to the six NPDES storm water monitoring stations.

The ITS located north of the Solar Ponds (OU4) is included as Pathway 7. This system was installed to protect North Walnut Creek from groundwater and surface water contamination present in the Solar Ponds (OU4) area. The ITS primarily collects groundwater, although some surface water runoff and seep flows are also collected. The destination of this ITS water is to storage tanks and eventual treatment as detailed in the IM/IRA for OU4; therefore, this water lies outside surface water monitoring of concern to this IM/IRA. It should be noted that most of the Industrial Area seeps/springs that are contaminated drain to Pathway 7. The pathways, destinations, and the NPDES monitoring station associated with the pathways are identified in Table 5-8 and shown in Figure 5-2.

FINAL

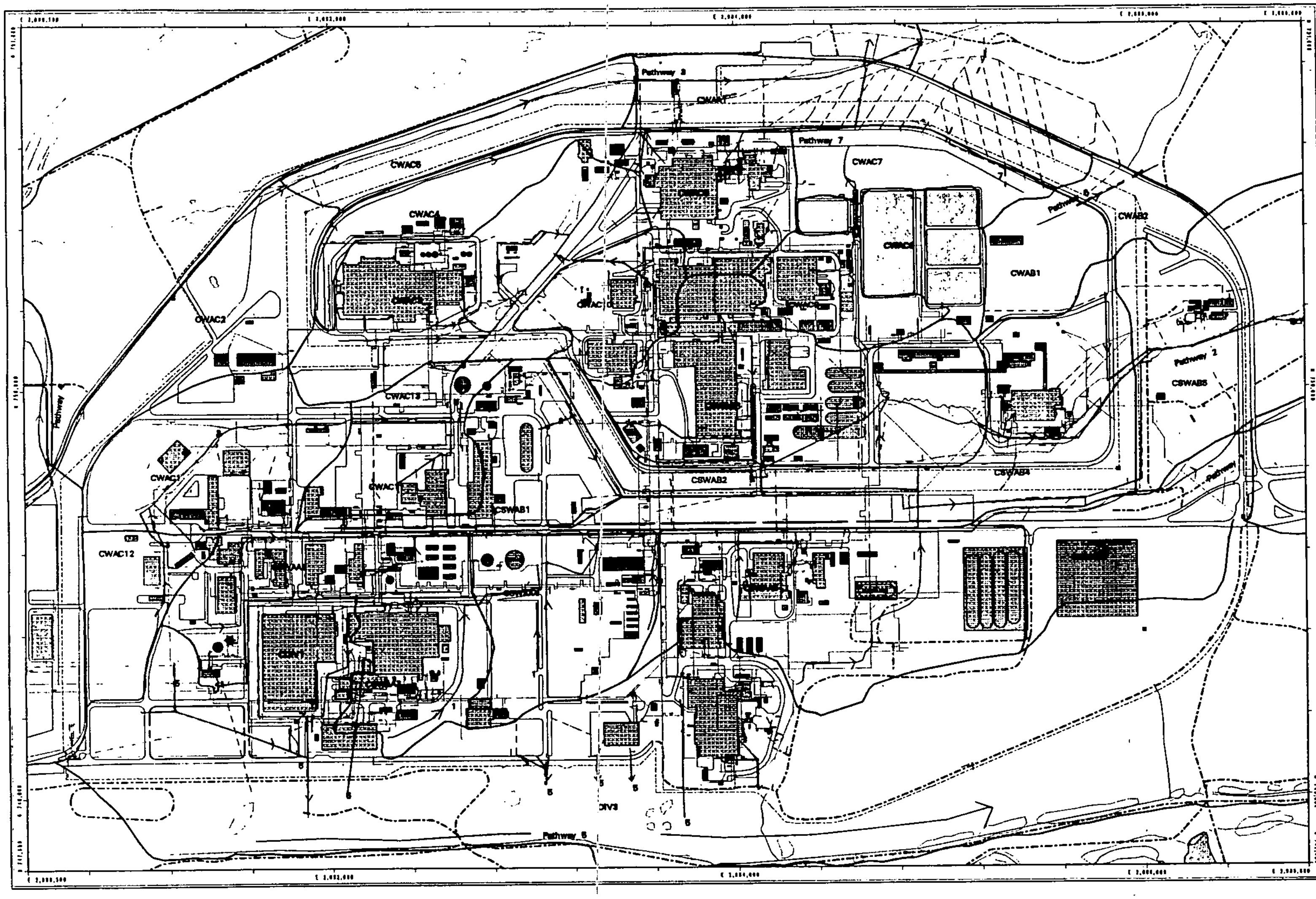


FIGURE 5-2

Industrial Area IM/IRA/DD Drainage Subbasins and Flow Pathways

Explanation

- Buildings or other structures
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences
- Paved roads
- Dirt roads
- Storm Drain System
- Wetlands
- Drainage Subbasins
- Overland Flow Pathways
- CSWAB4 - Subbasin Pathway

U.S. Department of Energy
Rocky Flats Plant

Prepared by:
EG&G ROCKY FLATS
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

November 18, 1994

(intentionally blank)

TABLE 5-8
Industrial Area IM/IRA/DD
Pathways, Destinations, and the Associated
NPDES Storm Water Monitoring Station
and/or RFP Gaging Station

Pathway	Destination	Current Monitoring Station
1	Pond B-5 via South Walnut Creek	SW022/GS10
2	South Walnut Creek	SW023/GS10
3	North Walnut Creek	SW093
4	McKay Diversion Canal	SW998
5	Pond C-2 via South Interceptor Ditch	SW027
6	A-Series Ponds	SW091
7	Interceptor Trench (Collection System)	Not part of the surface water monitoring program

5.4.1 Pathways and Subbasins

The following sections discuss each of the seven pathways. Each section contains two tables: the first defines the drainage area characteristics, and the second provides detail concerning the location of the drainage point relative to each of the individual subbasins. The pathway drainage tables list the subbasins within each pathway in upstream to-downstream order, the major buildings within the subbasins, and the total acreage of the area drained. In some cases, a second destination subbasin is listed when a variable pathway can exist because of the limited ability of the primary pathway to convey all runoff. The second table in each section identifies the point for each subbasin at which flow leaves that subbasin. These physical flow structures might represent the point at which monitoring for a subbasin can be conducted.

5.4.2 Pathway 1

Pathway 1 ultimately drains to Pond B-5 either directly or through South Walnut Creek from subbasin CSWAA6. Much of the Industrial Area located south of Central Avenue is tributary to Pathway 1. The subbasins, drainage areas, and drainage area characteristics are outlined in Table 5-9. Table 5-10 describes the locations of the subbasin drains.

5.4.3 Pathway 2

Pathway 2 drains to South Walnut Creek from subbasin CSWAB5. Subbasins that are tributary to Pathway 2 lie in the east-central portion of the Industrial Area. Also, a seep area west of Building 991 lies in this pathway. The drainage area characteristics and outlier locations for subbasins in Pathway 2 are described in Tables 5-11 and 5-12, respectively.

5.4.4 Pathway 3

Pathway 3 drains the north end of the Industrial Area to North Walnut Creek except for approximately 50 acres that drain to the ITS Collection System. Of the 8 acres comprising subbasin CWAC7, approximately 2 acres drain to Pathway 3, and the remaining 6 acres drain to the ITS collection system. Runoff from areas south of the ITS collection system drains north; typical surface water flow is effectively captured by the ITS for separate storage and treatment in accordance with the OU4 IM/IRA but large storm events (1 inch per hour or greater) can overwhelm the ITS. Wetland/seep areas northwest of Building 111 and east, southeast, and northeast of Building 374, near the northwestern Industrial Area boundary, are situated along Pathway 3. An extensive area of seepage occurs north of the ITS and may also drain into this pathway. Tables 5-13 and 5-14 summarize the drainage characteristics and outfall locations of Pathway 3.

TABLE 5-9
Industrial Area IM/IRA/DD
Pathway 1 Drainage Area Characteristics

Subbasin	Major Buildings in Subbasin	Drainage Area (acres)	Drains to	Overflows to
CSWAA2	122, 123, 124, 125, 441, 443, 442, 452	13	CSWAA4	
CSWAA3	439, 440 (northeast), 444, 445, 447 (east), 463, 668	12	CSWAA4	
CSWAA4	221, 224, 275, 662, 663, 664	16	CSWAA5	
CSWAA5	865, 866, 883 (north), 884, 886, 888, 889, 880	28	CSWAA6	
CSWAA6	NONE	15	CSWAB5	

TABLE 5-10
Industrial Area IM/IRA/DD
Outlets from Each Subbasin in Pathway 1

Subbasin	Location of Subbasin Drain
CSWAA2	A 21-inch CMP located in the northeast corner of subbasin CSWAA2
CSWAA3	A ditch at the northeast corner of subbasin CSWAA3
CSWAA4	An 18-inch CMP culvert located in the northeast corner of subbasin CSWAA4
CSWAA5	A 24-inch CMP under Central Ave. located near the northeast corner of subbasin CSWAA5
CSWAA6	Two culverts, a 30-inch RCP and a 30-inch CMP, drain the northeast corner of CSWAA6 and empty to a channel east of the Industrial Area that drains to Pond B-5

CMP = corrugated metal pipe
RCP = reinforced concrete pipe

TABLE 5-11
Industrial Area IM/IRA/DD
Pathway 2 Drainage Area Characteristics

Subbasin	Major Buildings in Subbasin	Drainage Area (acres)	Drains to	Overflows to
CSWAB1	223, 333 (south), 334 (south), 549, 551 (east), 552, 553, 554, 555, 558	20	CSWAB5	
CSWAB2	NONE	6	CSWAB3	CSWAB4
CSWAB3	559 (southeast), 561 (south), 564, 707, 708, 750, 776 (southeast), 777 (south), 778 (east), 980	31	CSWAB5	CSWAB4
CSWAB4	965, 968, 984, 985, 989 990 991, 996	19	CSWAB5	
CSWAB5	987, 988, 993, 995	15	South Walnut Creek (SW023)	

5.4.5 Pathway 4

Pathway 4 drains subbasin CWADIV2 to the McKay Diversion Canal. CWADIV2 is just to the west of the area shown in Figure 5-2. This canal drains to the Walnut Creek Diversion Canal, which flows around the north end of the Industrial Area. In addition, a portion of CWADIV2 drains into Pathway 3. The areas tributary to Pathway 4 have relatively little industrial development. Most of the developed area on this pathway consists of engineering and administrative buildings, but a warehouse and a material storage yard are associated with Building 130. No other industrial operations are associated with this pathway.

The drainage area characteristics for Pathway 4 are summarized in Table 5-15. Table 5-16 gives the locations of the subbasin drain for Pathway 4.

TABLE 5-12
Industrial Area IM/IRA/DD
Outlets from Each Subbasin in Pathway 2

Subbasin	Location of Subbasin Drain
CSWAB1	A 72-inch CMP storm sewer located at ponded area at east end of subbasin CSWAB1
CSWAB2	A 4-foot by 3-foot elliptical CMP storm sewer located southeast of Building 707, near the middle of subbasin CSWAB2
CSWAB3	A 60-inch CMP storm sewer located at the eastern end of subbasin CSWAB3
CSWAB4	A 54-inch-diameter culvert located at the eastern end of subbasin CSWAB4
CSWAB5	Two culverts, both 30-inch RCP, located at the eastern end of subbasin CSWAB5

5.4.6 Pathway 5

Pathway 5 is a collection of drains that drain from the southern end of the Industrial Area to subbasin DIV3 and eventually to the SID. The Building 881 area is part of subbasin DIV3. Hydrologically, the area around the buildings drains toward the south and down the 881 Hillside toward the SID, as does the rest of subbasin DIV3. Seeps also exist near the southwestern Industrial Area boundary and flow into this pathway. The drainage area characteristics and outlet locations for the subbasins in Pathway 5 are outlined in Tables 5-17 and 5-18, respectively.

5.4.7 Pathway 6

Pathway 6 drains two subbasins located in the northeast quadrant of the Industrial Area to the A-series ponds. An extensive area of seepage also occurs north of the ITS and may flow into this pathway. Tables 5-19 and 5-20 summarize the drainage area characteristics and outfall locations for the subbasins included in Pathway 6.

TABLE 5-13
Industrial Area IM/IRA/DD
Pathway 3 Drainage Area Characteristics

Subbasin	Major Buildings in Subbasin	Drainage Area (acres)	Drains to	Overflows to
CWAC12	119, 127, 128	9	CWAC1	
CWAC1	111, 112, 113, 115, 335	17	CWAC13	
CWAC11	331, 333 (north), 334 (north), 551 (west)	9	CWAC13	
CWAC13	NONE	3	CWAC3	
CWAC10	559 (except southeast), 561 (north), 776 (west), 778 (west)	9	CWAC3	
CWAC3	371, 374, 516, 517, 518	26	North Walnut Creek	CWAC4
CWAC2	367	18	CWAC5	
CWAC5	NONE	10	North Walnut Creek	CWAA1
CWAC4	262, 373, 376, 790	10	CWAC6	
CWAC6	701, 712, 713, 770, 771, 774, 776 (northeast), 777 (northwest)	10	CWAC7	
CWAC7	NONE	8	ITS	CWAA1
CWAA1	NONE	15	North Walnut Creek, ITS	

TABLE 5-14
Industrial Area IM/IRA/DD
Outlets from Each Subbasin in Pathway 3

Subbasin	Location of Subbasin Drain
CWAC12	Three storm sewer outfalls flowing north under the northern edge of CWAC12 drain the subbasin to a ditch running through CWAC1.
CWAC1	Ditch north of Sage Ave. drains to CWAC13 at the eastern end of CWAC1.
CWAC11	Two culverts, an 18-inch CMP and an 8-inch CMP, are located at the northeast corner of subbasin CWAC11.
CWAC13	A 64-inch CMP culvert is located at the north end of CWAC13.
CWAC10	An 18-inch CMP culvert located along the northwestern boundary of CWAC10 drains to the channel that runs through CWAC3; also a 14-inch CMP crosses the subbasin boundary under the intersection of Sixth St. and South 71 Dr.
CWAC3	A 48-inch CMP culvert is located near the northeast corner of subbasin CSWA3. This sewer drains directly into the 72-inch storm sewer that empties into North Walnut Creek.
CWAC2	A 54-inch CMP storm sewer is located at northern end of CWAC2.
CWAC5	A 72-inch CMP storm sewer carries flow from east end of CWAC5 to North Walnut Creek.
CWAC4	An 8-inch-diameter PVC storm sewer is located at the northeast corner of subbasin CWAC4.
CWAC6	An 18-inch CMP culvert is located at the northeast corner of CWAC6.
CWAC7	Only a portion of CWAC7 drains to N. Walnut Creek. The flow that enters from CWAC6 and the flow contributing north (or downgradient) of the Interceptor Trench System will flow through the 60-inch-diameter storm sewer at the north end of CWAC7. This sewer connects to the 72-inch storm sewer that drains to North Walnut Creek.
CWAA1	A 36-inch culvert located at the center of the northern boundary of the CWAA1 drains the subbasin to North Walnut Creek.

TABLE 5-15
Industrial Area IM/IRA/DD
Pathway 4 Drainage Area Characteristics

Subbasin	Major Buildings in Subbasin	Drainage Area (acres)	Drains to	Overflows to
CWADIV2	130, 131	29	McKay Diversion Canal	CWAC2
CWADIV2		5	CWAC1	

TABLE 5-16
Industrial Area IM/IRA/DD
Outlets from Each Subbasin in Pathway 4

Subbasin	Location of Subbasin Drain
CWADIV2	A 36-inch CMP culvert located at the northern end of CWADIV2 that drains to the McKay Diversion Canal

TABLE 5-17
Industrial Area IM/IRA/DD
Pathway 5 Drainage Area Characteristics

Subbasin	Major Buildings in Subbasin	Drainage Area (acres)	Drains to	Overflows to
CDIV1	440 (except northeast), 447 (west), 448, 451, 460	14	DIV3	CSWAA3
DIV3	850, 881, 883 (south), 885, 887		SID	

TABLE 5-18
Industrial Area IM/IRA/DD
Outlets from Each Subbasin in Pathway 5

Subbasin	Location of Subbasin Drain
CDIV1	A 36-inch-diameter culvert drains the storm sewer network, south of Building 460; the storm sewers daylight on the hillside south of Building 664 into the SID.
DIV3	Drainage in the vicinity of Buildings 850 and 881 drains to the south. The Building 881 footing drain is collected and diverted to the OU1 treatment facility.

TABLE 5-19
Industrial Area IM/IRA/DD
Pathway 6 Drainage Area Characteristics

Subbasin	Major Buildings in Subbasin	Drainage Area (acres)	Drains to	Overflows to
CWAB1	964	7	CWAB2	
CWAB2	NONE	4	A-series Ponds	

TABLE 5-20
Industrial Area IM/IRA/DD
Outlets from Each Subbasin in Pathway 6

Subbasin	Location of Subbasin Drain
CWAB1	A 48-inch-diameter culvert drains CWAB1 toward the northeast into CWAB2.
CWAB2	A 48-inch CMP culvert drains CWAB2 toward the northeast into a channel leading to the A-series ponds.

5.4.8 Pathway 7

Pathway 7 represents the northeast quadrant of the Industrial Area that is currently being collected by the ITS system. The water collected by the ITS system is stored in tanks north of the Industrial Area and eventually treated in either the OU4 evaporators or at Building 374. Surface water runoff from the portions of subbasin CWAC7 (approximately 6 acres) upgradient from the ITS flows into the ITS. Also, some groundwater flow beneath subbasins CWAA1 and CWAB2 is collected by the ITS. Subbasin CWAC8 is composed of the Solar Evaporation Ponds and their immediate vicinity. If precipitation falls within the lined Solar Ponds themselves, it is naturally evaporated or treated in either the OU4 IM/IRA treatment system or in Building 374. Precipitation falling immediately outside the lining of the Solar Ponds infiltrates the soils and is probably collected by the ITS or becomes surface water runoff, which is also collected by the ITS. Precipitation falling in subbasin CWAC8 (the Solar Ponds) is collected and sent to the Building 374 treatment facility. Table 5-21 shows the drainage characteristics for the subbasins located in Pathway 7. Subbasin drain locations are described in Table 5-22.

TABLE 5-21
Industrial Area IM/IRA/DD
Pathway 7 Drainage Area Characteristics

Subbasin	Major Buildings in Subbasin	Drainage Area (acres)	Drains to	Overflows to
CWAC9	215, 705, 706, 729, 777 (northeast), 779, 782, 928, 966	6	CWAC7	CSWAB3
CWAC8	788, Solar Ponds 207A, 207B, 207C	10	Infiltration/ITS	N/A
CWAC7	NONE	8	ITS	Walnut Creek

TABLE 5-22
Industrial Area IM/IRA/DD
Outlets from Each Subbasin in Pathway 7

Subbasin	Location of Subbasin Drain
CWAC9	An 18-inch CMP storm sewer that drains CWAC9 between the 207A and 207C Solar Ponds and daylights on the hillside just north of the Solar Ponds
CWAC8	Not hydrologically connected to Industrial Area drainage patterns. Precipitation falling in subbasin CWAC8 is collected and sent to the Building 374 treatment facility.
CWAC7	The portion of CWAC7 upgradient from the ITS flows into the ITS.

5.4.9 Industrial Area Buildings

Table 5-23 references the major industrial area buildings to the pathways identified in Sections 5.4.2 through 5.4.8. Surface water runoff resulting from precipitation falling on or in the vicinity of the building will drain to the pathway indicated. In some instances, a boundary for a drainage subbasin passes through a building. In these instances, that portion or quadrant of the building that contains flows along a particular pathway is identified.

5.4.10 Foundation Drains

Foundation drains are of particular concern in the Industrial Area because of their potential for transporting contamination. These drains are found under and around building foundations and are used to control groundwater levels to prevent basement flooding. In some cases, it is believed that these foundation drains may receive roof drain waters as well. Waters from foundation drains often flow into the storm drain system or directly into the environment as surface water flow. It is important to note

TABLE 5-23
Industrial Area IM/IRA/DD
Cross-Reference of Major Buildings to Pathways for Surface Water Runoff

Building	Pathway	Building	Pathway	Building	Pathway
111	3	447 (west)	5	776 (west and northeast)	3
112	3	448	5	777 (south)	2
113	3	451	5	777 (northeast)	7
115	3	452	1	777 (northwest)	3
119	3	460	5	778 (east)	2
122	1	463	1	778 (west)	3
123	1	516	3	779	7
124	1	517	3	782	7
125	1	518	3	788	7
127	3	549	2	790	3
128	3	551 (east)	2	850	5
130	4	551 (west)	3	865	1
131	4	552	2	866	1
207A, B, C	7	553	2	880	1
215	7	554	2	881	5
221	1	555	2	883 (south)	5
223	2	558	2	883 (north)	1
224	1	559 (except southeast)	3	884	1
262	3	559 (southeast)	2	885	5
275	1	561 (south)	2	886	1
331	3	561 (north)	3	887	5
333 (north)	3	564	2	888	1
333 (south)	2	662	1	889	1
334 (north)	3	663	1	928	7
334 (south)	2	664	1	964	6
335	3	668	1	965	2
367	3	701	3	966	7
371	3	705	7	968	2
373	3	706	7	980	2
374	3	707	2	984	2
376	3	708	2	985	2
439	1	712	3	987	2
440 (except northeast)	5	713	3	988	2
440 (northeast)	1	729	7	989	2
441	1	750	2	990	2
442	1	770	3	991	2
443	1	771	3	993	2
444	1	774	3	995	2
445	1	776 (southeast)	2	996	2
447 (east)	1				

that although surface water flow from the immediate vicinity of a building may follow a particular pathway out of the Industrial Area, foundation drain flows for that building may be conveyed by pipes to another subbasin and, thus, to another pathway. Section 7.0 of this IM/IRA/DD provides additional details on foundation drains including monitoring and sampling locations and foundation drain flow patterns. Foundation drains that have been confirmed by visual inspection or engineering drawings and their subsequent flow pathways, as currently understood, are identified in Table 5-24.

5.5 EVALUATION OF MONITORING PROGRAM AND ADDITIONAL DATA NEEDS

The existing surface water monitoring program was evaluated to determine whether it will meet the objectives of this IM/IRA. Generally stated, the purpose of this IM/IRA is to conduct environmental monitoring in a manner sufficient to detect releases to the environment resulting from D&D or other nonroutine activities. It is of primary importance to identify potential releases at the fenceline of the Industrial Area, but it is also desirable to identify potential releases as close to the source as possible. Because the existing programs were designed to meet other specific regulatory requirements, they may not be consistent with these objectives. Consistent with Section 5.3, the evaluation of the surface water monitoring program is logically separated into two general categories: evaluation of the monitoring of base flow conditions and the monitoring of storm flow conditions. Only through adequate characterization of both general categories of flow can a complete characterization of surface water be achieved. As previously discussed, the current program for surface water quality characterization emphasizes water quality in the drainage ponds.

Monitoring base flow quality allows detection of releases to groundwater that ultimately discharges to surface water and spills directly to surface water. Spills to surface soils or

TABLE 5-24
Industrial Area IM/IRA/DD
Confirmed Foundation Drains and Pathways

Building	Foundation Drain	Surface Water Pathway	Building	Foundation Drain	Surface Water Pathway
111	FD-111-1	3	774	FD-774-1, FD-774-2, FD-774-3	3
371/374	FD-371-1, FD-371-2, FD-371-3	3	779	FD-779-1	7
517/518	FD-371-4, FD-371-5, FD-371-6	3	850	FD-850-1	5
371 Condensate from Utility Lines Near Building 371	FD-371-MC	3	865	BS-865-1 BS-865-2	Collected for treatment in Building 374
444, 447	FD-444/460	5	881	FD-881-1	Collected for treatment in OU1 treatment facility
559, 561	FD-516-1	3 (Foundation drain discharge discontinued in March 1993)	883	FD-883-1	1
559, 561	FD-559/560	Sent to WWTP for treatment	886	FD-886-1, FD-886-2	Collected for treatment in Building 374
707	BS-707-1, BS-707-2, BS-707-3	2	991	FD-991-1	Not verified
771	FD-771-1	3			

pavement exposed to rainwater are likely to be detected in particulates carried during storm events, making monitoring of stormwater an essential part of this project.

5.5.1 Base Flow Conditions

Considerable data for base flow surface water conditions have been generated and analyzed at RFP, as described in Section 5.3.1 of this report. These data were instrumental in identifying contaminated seeps that are currently being separately collected and treated as part of OU activities.

Based on the goals and objectives of this IM/IRA, the following are identified as additional data or monitoring needs pertinent to surface water base flows within the Industrial Area:

- The surface water characterization program within the Industrial Area is largely inactive. Data that would be useful in identifying potential releases from the Industrial Area are not routinely generated.

- The existing data analysis for surface water within the Industrial Area is insufficient to identify contaminants in surface water. For instance, contaminants may only be detected in seeps during moist periods when alluvial groundwater rises into a contaminated IHSS location upgradient of the seep. This seasonal effect has not been adequately investigated.

- Surface water base flows within the Industrial Area are not sufficiently quantified to date. Attempts to quantify these base flows have been made but have resulted in estimates that require further verification.

- The range of baseline quality variations in base flows requires identification on a sampling point by sampling point basis. These data are included in the 1989 and 1990 Surface Water and Sediment Geochemical Characterization reports (EG&G 1992b, c), but the evaluation presented within the reports groups several sampling locations making it difficult to assess water quality at individual points. The groups were defined based on geographic location or proximity to an OU. The continuing analysis of existing data is also necessary.

- Establishment of surface water sampling stations, with the exception of the six NPDES stormwater sampling stations, was not based on an evaluation of drainage basins and subbasins. Thus, even for those drainage subbasins within which base flows occur, there are little or no data on the quality of water leaving those subbasins. Such data are critical to establishing baseline water quality before conducting nonroutine D&D activities in each subbasin.

The following section addresses the evaluation of the stormwater sampling and characterization program as it pertains to D&D activities or other nonroutine activities.

5.5.2 Stormwater

A considerable amount of data for stormwater, including much of the stormwater leaving the Industrial Area, has also been generated and analyzed at RFP. These data include a wide range of analytes. The overall results of the programs pertinent to this IM/IRA/DD are presented in Section 5.3.2 of this report. These data were primarily generated in support of the NPDES stormwater permit application, which was submitted in October 1992. It is anticipated that the NPDES stormwater permit, when issued, will not include numeric limits on the quality of water discharged from the IA perimeter outfalls. Currently, the stormwater data being generated are primarily focused on radionuclide and metal transport data. Furthermore, some of the six NPDES stormwater sampling stations are not currently active.

Based on the current situation, the following additional data needs are identified pertinent to stormwater flows within the Industrial Area:

- Some of the six NPDES stormwater stations sample stormwater that could be considerably diluted with non-Industrial Area flows. Thus, detection of potential releases at some of these stations may be difficult because of excessive dilution of contaminants.

- Very little VOC data are available for stormwater, partially because of the logistics involved in collecting high quality, manual grab samples during storm events.

- Radionuclides are not consistently tested for, nor have careful and detailed characterization activities for isotope-specific analyses been conducted for all isotopes of interest at all locations near the Industrial Area boundary.

- No attempt has been made to trace contaminants identified in stormwater in a drainage basin back to specific sources.

- No subbasin-specific stormwater monitoring has been performed in the Industrial Area.

- Stormwater quality data do not exist to characterize the first flush of contaminants from a drainage subbasin as well as the hydrograph-integrated transport of contaminants from a drainage subbasin. Significant transport of contaminants can occur with the first flush of storm runoff or high flow. However, these data do exist for the larger drainage basins.

- In reviewing the existing stormwater data, there is a lack of flow data. This is particularly true with base flow quantifications. Base flow in the Industrial Area is directly dependent on precipitation, and it is nonexistent during dry periods.

5.6 SURFACE WATER MONITORING TECHNOLOGIES ASSESSMENT

The goal of the surface water monitoring technologies assessment is to identify new technologies and instrumentation that will improve the surface water monitoring program efficiency and improve the capability to detect releases.

The review and evaluation of new technologies were performed to identify and evaluate new technologies that monitor, detect, and respond to potential releases of constituents to surface water at RFP. The assessment approach considered future D&D monitoring activities and requirements. The two primary monitoring requirements addressed were real-time monitoring and environmental levels of sensitivity. These technologies were specifically researched for each monitoring parameter. A limited review of surface water monitoring technologies was performed during this assessment. This technology assessment did not include cost versus benefit and product life cycle evaluations.

Real-time monitoring instruments with the capability to detect surface water parameters at environmental levels were of primary interest during this evaluation. Environmental levels are considered to be sub-picocuries per liter in water for radiological parameters and milligrams per liter (mg/L) and μg/L in water for nonradiological parameters.

The efforts of this assessment determined that no commercially available real-time analytical methods or instrumentation are available to directly and reliably monitor radiochemistry at environmental levels in water. For the purposes of this assessment, only nonradiological monitoring instruments were evaluated. The priority of this assessment was placed on improvements to existing instruments currently supporting the RFP surface water monitoring program. Table 5-25 shows the current monitoring systems and recommendations for surface water monitoring technologies for RFP. The technologies represented by the current monitoring systems provide adequate capabilities to support the current program. Recommendations are provided as possible upgrades and should be evaluated further to determine their applicability and cost effectiveness.

The review and evaluation of new technologies was approached in the following step-by-step manner:

1. Gain an understanding of the current monitoring programs and identify basic monitoring goals, including the development of technologies assessment criteria.

2. Determine the specific monitoring instruments and technologies currently used by the environmental programs at RFP.

3. Obtain environmental technologies information from personnel at RFP and other DOE facilities involved with the environmental monitoring programs.

4. Contact the manufacturers of the current instrumentation and determine available upgrades to existing RFP instruments and the benefits achieved from the upgrades.

5. Contact other manufacturers of similar instrumentation to evaluate technologies and compare to current RFP instrumentation performance.

TABLE 5-25
Industrial Area IM/IRA/DD
Surface Water Monitoring Technologies

Current Monitoring System	Recommendations	Rationale
Real-Time Radiotelemetry Monitoring	Adequate. Update multiprobe instrument to include turbidity sensor, data logging, and programmability.	Decrease number of instruments needed to lower potential downtime and increase reliability.
Automated Surface Water Sampling	Adequate. Update automated sampling equipment to include automated bladder pump or ball valve intake VOC samplers.	Detect and characterize VOCs.
Field Parameter Sampling	Adequate.	No advantages identified from the evaluation of alternative instrumentation.

6. Determine R&D technologies available and information contacts.

7. Evaluate information obtained from assessment and develop recommendations.

This assessment identified literature concerning current and possible future systems, databases, technology information transfer programs, and the strengths and limitations of current and new technologies.

Existing DOE facilities located in Fernald, Ohio, and Weldon Spring, Missouri, that have radiological and nonradiological environmental monitoring requirements similar to RFP were contacted to ascertain technologies and instruments used for monitoring at other DOE facilities. Generally, these facilities were using similar technologies and instruments for their monitoring activities.

Several DOE sources of R&D technologies were also identified. These include (1) Environmental Technologies Group at RFP, (2) Los Alamos National Laboratories (LANL), Technologies Group, and (3) Nevada Field Office, Office of Technology Development. Other private-sector R&D innovative technologies sources appear to be available including engineering departments of major instrument manufacturers and educational institutions.

The majority of the manufacturers and/or vendors of environmental surface water monitoring instruments currently used at RFP were also contacted to determine the most recent upgrades and improvements to the existing monitoring instrumentation. New technologies were evaluated if they were available and met the assessment criteria stated in Section 9.2.

The following four surface water programs (and related monitoring instruments) were studied at RFP during the technologies assessment:

- regulatory compliance monitoring;
- routine operational monitoring;
- routine site-wide surface water monitoring; and
- site-wide storm event monitoring.

These programs monitor surface water quality for both radiological and nonradiological surface water quality parameters.

The technologies and instrumentation related to the four surface water programs previously listed are currently used interchangeably within each individual surface water monitoring program. Therefore, for the purposes of this assessment, general technologies and instrumentation common to the four surface water programs are presented.

New technologies in the R&D stages were also reviewed, but not evaluated because of lack of availability. R&D technologies for real-time monitoring at environmental levels of nonradiological parameters in surface water do exist. However, these technologies require more evaluation to determine their applicability, cost effectiveness, and reliability.

New technologies in the R&D stages were reviewed but not evaluated since these technologies and instrumentation used are not currently available commercially.

Elements of the surface water program not addressed in this monitoring technologies assessment include (1) sediment sampling, (2) potable/building water supply sampling and monitoring, and (3) monitoring of groundwater seeps. Surface water programs related to the wastewater treatment plant and biological constituents were reviewed but not evaluated to make recommendations.

The sample collection and monitoring instrumentation used for the four surface water monitoring programs discussed earlier include (1) real-time radiotelemetry, (2) automated sampling, and (3) field parameter sampling.

5.6.1 Real-Time Radiotelemetry Monitoring

Radiotelemetry stations are used to record real-time water quality or water flow/level information at 12 monitoring stations located within the RFP boundary, two of which are positioned within the Industrial Area.

The following details the 12 monitoring points (station name and location) that currently have real-time monitoring using radiotelemetry:

GS029	Pond C-1
GS11	Pond A-4
GS12	Pond A-3
GS13	Pond A-1 By-Pass
GS14	Woman Creek below Pond C-2
GS16	Antelope Springs Creek above Woman Creek
GS09	Pond B-4 flow through
Pond B-3	Piezometer well and flow through culverts from Central Avenue and Pond B-3
Pond C-2 Dam	Water quality sensors and pond capacity measurements
Pond B-5	Water quality sensors and pond capacity measurements
GS01	Woman Creek at Indiana Street; east fenceline
RPT2	Repeater station south of Woman Creek

Plate 5-1 provides the locations of these real time monitoring capabilities, except RPT2 which is located south of Woman Creek overlooking Ponds C-1 and C-2.

The telemetry surface water monitoring network combines real-time monitoring sensors with bidirectional radio-based transmissions systems and data processors. The radiotelemetry stations are capable of receiving instructions and transmitting data. The radiotelemetry monitoring stations are portable and are solar powered. Solar power specifications require monitoring instruments to use low voltage and low current. Siting of the units is limited only by line of sight of the radiotelemetry repeater tower.

Currently, RFP uses a combination of water quality sensors, transducers, and turbidimeters at each radiotelemetry monitoring station to monitor 11 surface water quality parameters and water flow. RFP uses the Hydrolab Model H20 Multiprobe for nonradiological water quality measurements at selected radiotelemetry monitoring stations. The H20 multiprobe is a multiparameter water-quality monitoring system capable of providing real-time water quality information for the following parameters: temperature, dissolved oxygen, percent dissolved oxygen saturation, specific conductance, salinity, conductivity, resistivity, TDS, pH, and redox potential. Real-time turbidity measurements are performed at each station using a separate turbidimeter instrument manufactured by the Hach Company.

Water depth and flow rate measurements are performed by transducers and electronic flow meters. Pressure transducers manufactured by Druck, Model PTX-161/D, are used to measure water depth in free-standing water bodies, and electronic flow meters manufactured by ISCO measure flow rates through various flow-control devices, including flumes, weirs, and culverts. Some flow measuring equipment are enclosed in structures designed for year-round operation. Water depth and flow rate measurements provide the capability of calculating constituent mass loading to assess constituent fate and transport.

Currently, the real-time radiotelemetry network uses controllers manufactured by Bristoll Babcock combined with data recorders manufactured by Moore Industries to record data and operating parameters.

The specific criteria used to assess new equipment for surface water radiotelemetry systems included weather resistance, low maintenance, high accuracy at low detection levels, reliability, and ease of calibration. New or improved equipment available has expanded capabilities over current instrumentation. The ability to measure turbidity, data logging, and programmability has been added to recent commercially available multiprobe monitors including the H20 multiprobe. These improved capabilities may allow the use of only one monitoring probe to perform the current water quality measurements. These capabilities may increase sample collection quality (i.e., reliability) and decrease maintenance efforts.

The instrumentation and the radiotelemetry system used at RFP were determined to be adequate for the current surface water monitoring objectives. Recommendations for upgrading the instruments should be more fully evaluated to determine their applicability. Assessment of instrumentation related to D&D activities is discussed in Section 9.4.

5.6.2 Automated Surface Water Sampling

Thirteen stream gaging stations in the RFP buffer zone are equipped with automated sampling equipment (EPA 1993). Surface water samples are collected and analyzed by the laboratory for suspended sediment, total metals, total radionuclides, and organic constituents. Flow rates through flumes, weirs, and culverts are also measured at automated surface water stations.

Automated sampling instrumentation is used at stream gaging stations to collect water quality samples at specific flow intervals (EG&G 1993a). These samplers are equipped with a peristaltic pump that pumps water from a sampling tube anchored to the stream bed or flow control structure. The samplers are programmable so samples may be collected during specific periods of time or stream stages. The automated monitoring stations at RFP are mainly configured to collect composite samples during a stormwater event. The sampling interval is selected based on the local drainage basin characteristics and programmed to collect samples at the initial rise in stage through the maximum of the basin's characteristic hydrograph. These samplers are particularly useful for obtaining flow-weighted snowmelt and storm-event related samples, as well as time-weighted composite samples.

Three models of automated samplers are currently being used at RFP, all manufactured by ISCO: Model 2700 portable, Model 3700 portable, and Model 3700R refrigerated. Two types of flowmeters are used for the automated samplers: ISCO models 3220 and 3230. The meters also have data logging capabilities to record the stream stage and sample interval. Each station has a flow structure (i.e., weir, flume, culvert). The automated samplers are easy to disassemble and relocate; however, the flow structures are more permanently installed structures. The monitoring stations are powered by a combination of battery packs, alternating current power lines, and solar panels. Several of the gaging stations are part of the radiotelemetry system and are capable of transmitting data that are recorded on the flow meters.

The instrumentation used for the automated surface water sampling was determined to be adequate for current surface water monitoring objectives. However, recent advancements in technology have made automated VOC samplers commercially available. Automated VOC samplers would provide information useful for determination of VOC contamination.

5.6.3 Field Parameter Monitoring

Surface water grab samples are collected at selected locations throughout RFP to (1) address monitoring requirements imposed by the various regulations and permits, (2) provide a comprehensive onsite water quality database to assist with surface water management at RFP, and (3) develop an offsite database to assess the effects of RFP's activities and to assist in regulatory matters (EG&G 1992a).

Field parameter data collection is performed concurrent with field grab sample collection activities. Monitoring requirements are site specific depending on the individual drainage basin and associated COPCs. Each field grab sampling location has a required list of monitoring parameters. Appendix F of the *Draft Surface Water Management Plan* (EG&G 1992a) lists each location and related parameters.

The majority of the field samples collected during field grab surface water sampling are measured with field instruments manufactured by the Hach Company. Field parameters collected include (1) water and air temperature, dissolved oxygen, and total residual chlorine, which are measured by the Hach Model DR/2000; (2) conductivity, which is measured by the Hach Conductivity/TDS meter; and (3) pH, which is measured by the Hach One portable pH meter. Occasionally, the Yellow Springs Instruments (YSI) Model 50 is used to measure dissolved oxygen.

The instrumentation used to collect field grab samples was determined to be more than adequate for current field parameter surface water monitoring objectives. The field monitoring equipment manufactured by the Hach Company was determined to be reliable and accurate for field monitoring purposes. The field analysis procedures used by the Hach instruments are EPA-approved methods. No advantages were identified from the evaluation of alternative field sampling instrumentation.

5.7 PROPOSED ACTIONS FOR SURFACE WATER MONITORING PROGRAMS

As discussed in Section 5.4, there are seven major drainage pathways in the Industrial Area. Because surface water from Pathway 7 is collected and treated by the ITS, this pathway is not included in the proposed actions for the surface water monitoring program. The proposed actions for surface water monitoring that will be conducted as part of the Industrial Area IM/IRA/DD were developed to achieve the goals of the project, maximize use of available historical information, implement current monitoring programs, and minimize duplication. A three-tiered monitoring program is proposed for the Industrial Area during D&D activities. This three-tiered program will include monitoring (1) six of the seven major drainage pathways for runoff from the Industrial Area at the six NPDES outfalls, (2) the outfalls of subbasins that drain into these six pathways, where D&D activities are taking place, and (3) ensuring pathway protection procedures are working at the D&D locations.

The following sections describe proposed actions for surface water monitoring programs.

5.7.1 Industrial Area Outfall Monitoring

Characterization of surface water as it exits the Industrial Area is a key task for monitoring effects of D&D and other nonroutine activities. Since existing monitoring programs were designed to meet specific regulatory objectives, primarily at the RFP boundary, the Industrial Area is not currently adequately equipped to monitor the outflow of surface water from the Industrial Area fenceline. The objective of the Industrial Area outfall monitoring program is to characterize surface water leaving the Industrial Area and determine if D&D activities have impacted surface water. As discussed in Section 5.0, there are seven major pathways by which surface water can exit the Industrial Area. Six of these pathways will be monitored for releases using automated water sampling instruments, and results will be compared to available historical data. This activity will constitute one tier of the proposed monitoring program designed to identify potential releases resulting from D&D and other nonroutine activities. The following proposed actions have been identified for the surface water verification monitoring program:

- Culverts in the Industrial Area that represent a potential contaminant pathway for stormwater will be evaluated for flow monitoring and automatic sampling capabilities prior to D&D activities.

- Surface water automated sampling stations and flow meters will be installed in six of the seven major drainage pathways that drain the Industrial Area. These Industrial Area outfall sampling stations will collect water samples that will be analyzed for the most current NPDES stormwater analyte list as well as other potential analytes that could be released from D&D activities. The sampling stations will also support the NPDES and Event-Related Monitoring programs. The stations will sample water exiting the Industrial Area. Samples will be collected when predetermined increases in stream stage are measured or when surface flow is detected in typically dry drainages.

- A program will be developed to incorporate the automated sampling stations into existing programs to ensure that samples are handled in a uniform manner.

- Baseline concentrations and control limits will be established for the NPDES analyte list using available historical data. Baseline concentrations of COPCs will be determined using the methods discussed in Section 9.4. COPC concentrations will be compared with statistical warning limits.

- The six Industrial Area outfall sampling stations will be equipped with flow meters until the D&D activity is completed. The flow meter is necessary to measure flow in the drainage. Predetermined increases in stage will initiate the automated sampler.

These proposed actions represent the first tier of the monitoring program at the Industrial Area fenceline. The monitoring will operate continuously as long as D&D activities are being performed. All outfall and culvert monitoring locations will be reviewed by the Ecology Division to assess aquatic and terrestrial impacts to the Industrial Area's ecology.

5.7.2 Subbasin Monitoring and Sampling

Twenty-seven subbasins in the Industrial Area comprise the six drainage pathways of concern. The second tier of the proposed monitoring program consists of monitoring at the outlet of the subbasins where D&D activities are located. This tier presents a more detailed monitoring approach to identify potential releases. COPC lists will be compiled for each subbasin using the screening methodology described in Section 9.3. Subbasin monitoring stations will include flow measuring devices, pH and electrical conductivity sensors, automated samplers, and radiotelemetry hardware.

The objective of the subbasin monitoring program is to use water quality parameters (pH, electrical conductivity) as indicator parameters for perennial streams or appropriate seeps/springs with continuous flow. Perennial conditions are expected to occur only in a relatively few subbasin locations in the Industrial Area. These general water quality parameters will be measured using the radiotelemetry system to provide real-time data monitoring. Automatically collected samples will be processed and analyzed for a more detailed list of chemicals (COPCs) when these indicator parameters fall outside of predetermined warning limits.

A similar approach will be used for ephemeral or episodic surface water locations, which comprise the majority of subbasins in the Industrial Area. Because real time pH and electrical conductivity monitoring is not practical during dry conditions, the indicator variable will be stream flow. Stream flow or absence of flow will be monitored on a real time basis using radiotelemetry. When water is released by way of a storm or an uncontrolled release, it will be detected and a sample will be collected for analysis of indicator parameters (pH and electrical conductivity). If the results of these indicator parameters fall outside predetermined limits, a more detailed list of chemicals (COPCs) will be analyzed by a laboratory.

To ensure the adequacy of the real-time monitoring for detecting potential releases from D&D activities, grab samples will be collected and analyzed for the selected COPC (specific for that given subbasin) to verify that the indicator parameter monitoring is performing as intended. Attempts will be made to collect at least two grab samples during short D&D activities (two months or less in duration) and at least monthly during longer D&D activities. However, the actual frequency of sampling will depend on the timing of D&D activities and the occurrence of flow within the subbasins. Response actions to acute or chronic releases in the subbasins are discussed in Section 9.0.

The subbasin monitoring stations will be installed at the outfalls of subbasins where D&D activities are being performed. Runoff volume will be considered to identify appropriate station location. To retrieve proper sample volumes, the subbasin COPC list will be reviewed to determine necessary sample quantities. Historical information will also be used to determine if the subbasin will produce adequate volume during typical precipitation events. If the subbasin area is not large enough to provide adequate sample volumes, the station may be installed further downstream to incorporate more than one subbasin.

As previously discussed, placement of the monitoring stations is important to the quality of the monitoring program. Some subbasins may currently have historical information available as a result of former monitoring and sampling programs. Available information will be compiled to prepare a baseline data set.

The following proposed actions will be incorporated into this second tier of the D&D monitoring:

- Subbasins with scheduled D&D activities will be identified. COPC lists will be developed for each subbasin using available historical data, including building inventories and other sources.

- An evaluation will be made to compare existing monitoring locations with subbasin outfalls to determine which subbasins have usable historical data for compilation of baseline data sets.

- Subbasin monitoring station locations will be determined. The locations will be based on the ability of the subbasin to produce adequate volumes for sample analysis. Volume considerations will include (1) area of the subbasin and (2) infiltration within the subbasin. Historical searches will include rainfall studies, stormwater management plans, drainage plans, and other information.

- The monitoring stations will serve four primary functions: (1) real-time monitoring for pH and electrical conductivity for perrenial flow conditions flowing out of the subbasin, (2) collecting water samples using automated samplers, (3) measuring flows leaving the subbasin, and (4) transmitting real-time monitoring data and notification of sample collections through the existing radiotelemetry network.

- Stations will be installed up to 18 months in advance of the onset of related D&D activities to collect baseline data for indicator parameters. Automated samplers will also be installed 18 months in advance to collect baseline data for COPCs that are not available through historical searches.

- All subbasin monitoring locations will be reviewed by the Ecology Division to ensure minimal impact to the aquatic and terrestrial ecology in the Industrial Area.

5.7.3 Seeps and Springs

Seeps have been previously identified and observed to discharge water into surface water locations in the Industrial Area. The origin of the seeps is assumed to be primarily from two main sources: (1) groundwater and (2) incidental/foundation waters (foundation/ footing drains and roof drains possibly entering foundation drains).

These seeps represent a potential contaminant pathway from the Industrial Area. After evaluation of historical water quality data, a monitoring program may be established in the Industrial Area to detect and investigate sources of contamination detected in the seeps if analytical results indicate that the seeps truly represent a potential contaminant migration pathway.

There has been considerable sampling and analysis of seeps in the Industrial Area within the past three years. The seeps flow intermittently and predominantly during spring high groundwater conditions or immediately after storm events. The review of historical data is important to delineate areas for routine monitoring to detect potential contamination leaving the Industrial Area.

The following actions are proposed for monitoring seeps and springs within the Industrial Area:

- Existing seep data will be reviewed. Verified analytical data from previous seep monitoring will be extracted from the RFEDS data base and reviewed. Data will be technically reviewed to determine chemical concentrations and areas of potential contaminant sources. Data will be reviewed to evaluate COPC concentrations, groundwater baseline data, and background concentrations.

- Potential sources of contamination in seeps will be investigated. Seep data will be reviewed extensively to aid in investigating potential source areas. Potential contaminant source areas could be Individual Hazardous Substance Sites, a leaking sanitary sewer system, foundation drains influenced by UBC, or other sources.

- Additional analytical data needs for seeps might be discovered from the review of existing data and additional sampling may be necessary. In this case, confirmation monitoring of seeps suspected of issuing contaminated water will be performed. In addition, there might have been physical (building/topographical changes) or chemical changes (trend analysis) in the seep area that could warrant confirmation sampling.

- Based on the results of the confirmation monitoring activity, a seep monitoring program within the Industrial Area would be developed and implemented. Based on the historical data evaluation results, seep locations and frequency of monitoring may be identified in a work plan and implemented in the Industrial Area. Locations for monitoring will be based on factors such as seep water constituent concentrations relative to background surface water concentrations, historical information, and ecologically sensitive areas.

- Mitigative measures will be proposed to eliminate seep sources and discharges from the Industrial Area. Based on the results from the investigation of potential sources of contamination in seeps, if required, mitigative measures will be evaluated to eliminate contaminant sources from entering seeps and discharging outside the Industrial Area.

5.8 REFERENCES

EG&G Rocky Flats, Inc. 1993a. *Event-Related Surface-Water Monitoring Report, Rocky Flats Plant: Water Years 1991 and 1992.*

EG&G Rocky Flats, Inc. 1993b (January). *Rocky Flats Plant Surface-Water and Sediment Monitoring Program Summary.*

EG&G Rocky Flats Inc. 1993c. *Stormwater NPDES Permit—Application Monitoring Program, Rocky Flats Plant Site.*

EG&G Rocky Flats, Inc. 1993d. Greg Weatherbee, EG&G Surface Water Division. Personal communication.

EG&G Rocky Flats, Inc. 1993e. Bob Fiehweg, EG&G Surface Water Division. Personal communication.

EG&G Rocky Flats, Inc. 1993f. *Environmental Applications of Radio-based Telemetry for Surface Water Monitoring.*

EG&G Rocky Flats, Inc. 1992a. *Draft Surface Water Management Plan.* Prepared by Wright Water Engineers.

EG&G Rocky Flats, Inc. 1992b (April 1). *1989 Surface-Water and Sediment Geochemical Characterization Report.*

EG&G Rocky Flats, Inc. 1992c. *1990 Surface-Water and Sediment Geochemical Characterization Report.*

EG&G Rocky Flats, Inc. 1992d. *Evaluation of the Rocky Flats Surface-Water and Sediment Monitoring Programs.*

EG&G Rocky Flats, Inc. 1992e (April). *Rocky Flats Plant Drainage and Flood Control Master Plan.*

EG&G Rocky Flats. 1991. *Preliminary Geochemical Analysis of Groundwater and Surface Water in Seepage Areas along the Mesa, East of Operable Unit 2.*

U.S. Department of Energy. 1992a. *Final Surface Water Interim Measures/Interim Remedial Action Plan/Environmental Assessment and Decision Document, South Walnut Creek Basin, Operable Unit No. 2.*

U.S. Department of Energy. 1992b. *Proposed Interim Measure/Interim Remedial Action Plan Decision Document for the Solar Evaporation Ponds, Operable Unit No. 4, Final.*

U.S. Department of Energy. 1992c (October). *Application to the Environmental Protection Agency for Authorization to Discharge Under the National Pollutant Discharge Elimination System.*

U.S. Environmental Protection Agency. 1993 (September). *Environmental Applications of Radio Based Telemetry for Surface Water Monitoring.* SWD-020-93.

APPENDIX 5.1

INDUSTRIAL AREA IM/IRA/DD

SUMMARY OF CURRENT SURFACE WATER MONITORING ACTIVITIES

(intentionally blank)

Appendix 5.1
Table A. Summary of NPDES/FFCA Compliance Sampling

LOCATION	ANALYTES	FREQUENCY
Pond A-3	Nitrate	daily during discharge
	Flow	daily during discharge
	pH	daily during discharge
Pond B-3	5-Day Biological Oxygen Demand (BOD5)	once per week
	Total Suspended Solids (TSS)	once per week
	Nitrate	once per week
	Total Residual Chlorine (TRC)	daily
	Flow	daily
Pond A-4	Whole Effluent Toxicity (WET)	quarterly during discharge
	Nonvolatile Suspended Solids (NVSS)	daily during discharge
	Total Chromium	monthly during discharge
	Flow	daily during discharge
WWTP	pH	daily during discharge
	Total Residual Chlorine (TRC)	daily during discharge
	Total Suspended Solids (TSS)	two times per week
	Fecal Coliform	two times per week
	Total Phosphorous	two times per week
	Carbonaceous 5-Day BOD	two times per week
	Flow	daily
	Visible Oil and Grease	daily
	Target Analyte List Metals (HSL Metals)	once per month
	Volatile Organic Analytes (CLP)	once per month
	Total Chromium	weekly
	Whole Effluent Toxicity (WET)	quarterly
Pond B-5	Whole Effluent Toxicity (WET)	quarterly during discharge
	Total Chromium	monthly during discharge
	Flow	daily during discharge
Pond C-2	Whole Effluent Toxicity (WET)	quarterly during discharge
	Flow	daily during discharge

Adapted from EG&G (1993b). *RFP Surface-Water and Sediment Monitoring Program Summary*. January 1993.

Appendix 5.1
Table B. Summary of Agreement in Principle (AIP) Compliance Sampling

LOCATION	ANALYTES	FREQUENCY
Pond A-3	Tritium	daily during discharge
	Gross alpha/beta	daily during discharge
	Field Parameters	daily during discharge
Pond A-4	Tritium	daily during discharge
	Gross alpha/beta	daily during discharge
	Nitrate	daily during discharge
	Total Suspended Solids/Total Dissolved Solids	daily during discharge
	Field Parameters	daily during discharge
Pond B-5	Field Parameters	daily during discharge
Pond C-2	Total Suspended Solids/Total Dissolved Solids	daily during discharge
	Field Parameters	daily during discharge
Ponds A-4 B-5 and C-2	TSS, TDS, Anions, Nitrate, Alkalinity	predischarge splits with Colorado Department of Health (CDH), and weekly splits with CDH during discharge
	Gross alpha/beta	
	*Total Radionuclides (Pu, U, Am, etc.)	
	Semivolatile Organic Analytes (Method 625)	
	Volatile Organic Analytes (Method 502.2)	
	*Pesticides (Method 608)	*=predischarge only
	*Herbicides (Method 615)	
	*Triazine Herbicides	
	Total and Dissolved Metals (TAL-CLP)	
Building 124 Raw Water	Plutonium, Uranium, Americium	monthly composite

Adapted from EG&G (1993b). *RFP Surface-Water and Sediment Monitoring Program Summary*. January 1993.

Appendix 5.1
Table C. Summary of Operational Monitoring for DOE Orders

LOCATION	ANALYTES	FREQUENCY
WWTP Effluent	Gross alpha/beta	daily
	Nitrate	six times per week
	Chemical Oxygen Demand	two times per week
	Total Organic Carbon	daily
	Tritium	daily
	Ammonia	three times per week
	Hardness	one time per week
	Plutonium, Americium, Uranium	daily for a weekly composite
	Field Parameters	daily
WWTP Influent	Gross alpha/beta	daily
	Carbonaceous 5-Day Biological Oxygen Demand	two times per week
	Volatile Organic Analytes (CLP)	once per month
	Field Parameters	daily
Pond C-2	Plutonium, Uranium, Americium	weekly, four weeks before discharge
Pond C-1	Gross alpha/beta	daily
	Flow	daily
	Tritium	weekly
	Plutonium, Uranium, Americium	weekly composites
	Field Parameters (pH, conductivity, etc.)	daily
750/904 Runoff Pad	Gross alpha/beta	during precipitation events/two times a year (two/year)
	Nitrate	during precipitation events/two/year
	Cyanide	during precipitation events/two/year
	Target Analyte List Metals Plus Mercury	during precipitation events/two/year
	Volatile Organic Analytes (CLP)	during precipitation events/two/year
	Ammonia	during precipitation events/two/year
	Field Parameters	during precipitation events/two/year
	Total Dissolved Solids	during precipitation events/quarterly
	Tritium	during precipitation events/quarterly

Adapted from EG&G (1993b). *RFP Surface-Water and Sediment Monitoring Program Summary*. January 1993.

Appendix 5.1
Table D. Sample Volume, Container, and Preservation Requirements for Analytes in the Event-Related Surface Water Monitoring Program

Class of Analytes	Volume of Individual Samples from Auto-sampler	Volume Required for Analytical Methods	Preservative	Container	Analytical Methods
Total Target AnalyteList (TAL) Metals	1 Liter	100 mL	Nitric Acid to pH < 2	Polyethylene	CLP-Metals SW846-GFAA
Total Non-TAL Metals	1 Liter	100 mL	Nitric Acid to pH < 2	Polyethylene	CLP & SW846 ICPAES & GFAA
Total Radionuclides -Pu, U, Am -Gross Alpha -Gross Beta -Tritium (only at GS11, GS12, and GS13)	4 Liters	4 Liters	Nitric Acid to pH < 2	Polyethylene	GRRASP
Water-Quality Parameters -Anions -Alkalinity -Conductivity -TSS, TDS	1 Liter for all constituents	1 Liter plus	Cool to 4 degrees C	Polyethylene	300.0 310.1 120.1 160.1, 160.2 353.1
Nitrate/Nitrite-N -Total P	500 ml	500 ml	H_2SO_4/4C	Polyethylene	365
THE FOLLOWING ORGANIC SAMPLES WILL BE COLLECTED WHEN REQUESTED BY DOE/EG&G					
VOCs (Manually Collected)	120 mL	3x40 mL	Cool to 4 degrees C HCl to pH < 2	Glass VOA Vial	Glass VOA Vial
Pesticides/PCBs (Manually Collected)	1 Liter	350 mL	Cool to 4 degrees C	Amber Glass	505

Notes:

This Initial Parameter list will be revised after consultation with DOE. The analyte list and analytical methods will be refined to meet the needs of planned interpretive studies.

Frequency of samples: seasonally; approximately four times per year

APPENDIX 5.2
INDUSTRIAL AREA IM/IRA/DD
SUMMARY OF FIELD MONITORING ACTIVITIES
SURFACE WATER VERIFICATION MONITORING

APPENDIX 5.2 **FINAL**

INDUSTRIAL AREA IM/IRA/DD
SUMMARY OF FIELD MONITORING ACTIVITIES
SURFACE WATER: VERIFICATION MONITORING

Surface Water Monitoring Stations	Pathway	Real Time Indicator Parameters (pH, EC)[a]	Streamflow Monitoring (flow/stage)	Radiotelemetry Interface	Event Related Analyte List	Volatile Organics	Semi-Volatile Organics	Radionucleides	Metals	Sampling Frequency
SW022	1	N	Y	N	Y	Y	Y	Y	Y	SE
SW023	2	N	Y	N	Y	Y	Y	Y	Y	SE
SW093	3	N	Y	N	Y	Y	Y	Y	Y	SE
SW998	4	N	Y	N	Y	Y	Y	Y	Y	SE
SW027	5	N	Y	N	Y	Y	Y	Y	Y	SE
SW091	6	N	Y	N	Y	Y	Y	Y	Y	SE
Southern IA Culverts (8)	5	N	Y	N	N	Y[b]	Y[b]	Y[b]	Y[b]	M
Subbasin Verification (25)	ALL	Y	Y	F/I	N	Y[b]	Y[b]	Y[b]	Y[b]	M

F - Flow
I - Indicator parameters
Y - Yes
N - No
EC - Electrical conductivity

M - Monthly
SE - Storm event
a - For perennial stream subbasins only
b - Estimates; COPC analysis will be done during implementation phase of project

Section 6.0

6.0 AIR MONITORING

Air quality monitoring within the plant boundaries has been ongoing since the 1950s. The RFP monitoring programs emphasize compliance with regulatory requirements, protection of the environment, and the health and safety of the public. Effluent and ambient air measurements of radioactive and particulate concentrations are performed in and near the former research and production areas. The RFP monitoring program includes real-time screening, biweekly filter collection and screening, and a monthly filter composite analysis of radiological particle concentrations in effluent air. In addition, radiological and beryllium air effluent emissions from plant operations are continually measured or calculated at representative locations in the Industrial Area. Although many processes within the buildings have ceased, materials and contaminants of interest remain within and surrounding the Industrial Area facilities. Ambient air in and around RFP is also continuously sampled for particulates, including radioactive isotopes. All existing and recently proposed air quality and meteorology monitoring and effluent emissions characterization programs, emphasizing Industrial Area activities and contaminants, have been summarized and evaluated for incorporation into the verification monitoring program. The information presented in the following sections is current as of January 1994.

6.1 APPROACH

The RFP air quality and meteorological monitoring program was evaluated by reviewing existing plans, reports, and documents that (1) summarize ongoing and historical monitoring, (2) describe dispersion and dose modeling, (3) summarize effluent emissions data, (4) evaluate existing monitoring and reporting programs, and (5) recommend revisions for these programs. The description of existing air monitoring programs provided in this document was summarized from previously published RFP documents and personal communications with air quality program personnel. This evaluation considered the ability of the current air monitoring program to detect potential contaminant releases before and during D&D. Criteria considered important to the program include target contaminants, sampler design and location, and sampling procedures. The list of potential contaminants of concern for the air pathway included in the *Plan for the Prevention of Contaminant Dispersion* (PPCD) (DOE 1991a) was used to determine which constituents may need to be monitored (Appendix 3.2). This list was selected because (1) a COPC list for the IM/IRA/DD has not been formally approved and (2) the PPCD list was a reasonable alternative to considering a list of all potential constituents compiled from RFP inventories.

Ambient air quality and effluent emissions monitoring are discussed in Section 6.2. Meteorological monitoring is discussed in Section 6.2.6. Air dispersion modeling results are included in Section 6.3; pathways analysis is found in Section 6.4. The additional data needs and proposed actions identified during this evaluation are included in Sections 6.5 and 6.7. An evaluation of air monitoring alternatives is summarized in Section 6.6.

6.2 EXISTING PROGRAMS

At RFP, emphasis is placed on continuous air monitoring programs for radiological stack effluent emissions, gaseous radiological effluent emissions, and radioactive and nonradioactive particulates in ambient air. These programs were designed to collect data for the entire facility. Potential radioactive air pollutant emissions include plutonium, americium, uranium, and tritium. Nonradioactive air pollutants potentially emitted and monitored at the plant are beryllium, oxides of nitrogen (NO_x), TSP, and particulate matter less than 10 microns in diameter (PM-10). Chemicals of concern that could be emitted from past and current plant operations are carbon tetrachloride, Freon 113, hydrogen fluoride, nitric acid, phosphoric acid, sulfuric acid, and 1,1,1-trichloroethane. The primary types of emission sources are stacks, vents, tanks, ponds, landfills, and other diffuse sources.

Because production operations at RFP have stopped and the mission has changed, some associated emissions have been reduced or eliminated entirely; however, potential air emissions are still being controlled. All former production and research facilities at RFP are equipped with ventilation/filtration exhaust systems for effluent emissions control. Both radioactive and nonradioactive particles are contained by glove box and multiple banks of high efficiency particulate air (HEPA) filters (filter plenum systems). Particles are removed from the air effluent stream by these HEPA filters. Other controls at RFP include cyclones, baghouses, and electrostatic precipitators. Acids and other chemical emissions are controlled by scrubbers and charcoal filters; efficient low oxygen burners for gas-fired steam generation are used to reduce NO_x emissions.

The RFP air quality programs are administered by the Air Quality Division (AQD) within the Environmental Protection Management (EPM) Department, and the Emergency Preparedness Offsite Systems (EPOS) branch of the Health and Safety Department. Additional ambient air quality monitoring is performed by CDH to verify site monitoring.

Several documents have been prepared that summarize existing monitoring programs at RFP and that make recommendations for additional sampling locations and procedures. The *Final Environmental Monitoring Plan* (EG&G 1992a) provides a history of air sampling at the plant, a detailed description of the sampling and monitoring programs, quality assurance (QA) procedures for the air monitoring program, and plans and recommendations for program improvements. Other resources that were critical to this evaluation were (1) *Assessment and Integration of Radioactive Ambient Air Monitoring at Rocky Flats Plant* (EG&G 1993a), (2) *Rocky Flats Plant Air Quality Management Plan* (AQMP) (EG&G 1992b), and (3) *Rocky Flats Plant Radionuclide Air Effluent Emissions Monitoring Program Plan* (EG&G 1993b). The first two documents provide detailed recommendations for monitoring enhancements needed to characterize existing conditions in anticipation of RFP remedial activities and to comply with regulatory requirements. The third plan provides a description of RFP radionuclide air effluent emissions monitoring in compliance with National Emissions Standards for Hazardous Air Pollutants (NESHAP) requirements and the associated QA program. Additional documents that contain information useful to this evaluation are listed below. References are provided at the end of this section.

- *Plan for Prevention of Contaminant Dispersion* (DOE 1991a);
- *Rocky Flats Plant Site Environmental Report, January Through December 1992* (EG&G 1993c); and
- *Environmental Monitoring Plan* (EG&G 1992a).

The RFP air monitoring system consists of four subprograms: radiological effluent emissions, nonradiological effluent emissions, radiological ambient monitoring, and nonradiological ambient monitoring. RFP meteorological monitoring, weather forecasting, and air dispersion modeling are also components of the air monitoring program. Operating procedures, calibration, maintenance, and analytical procedures for air monitoring systems at RFP are documented in RFP Air Quality Sampling Standard Operating Procedures.

6.2.1 Radiological Emissions Monitoring

RFP continuously monitors and samples radionuclide air effluent emissions as required by DOE Order 5400.1 and EPA 40 CFR 61, Subpart H. Subpart H establishes the limit for the effective dose equivalent (EDE) of 10 millirem per year (mrem/yr) to any member of the public from air emissions of radioactive materials from RFP. Both requirements mandate continuous monitoring of radionuclide air emissions at all release points that have uncontrolled potential of discharging radionuclides into the air in quantities that could result in an EDE greater than 0.1 mrem/yr. However, effluent discharged from RFP buildings is filtered using HEPA filter plenums, and discharges are controlled (EG&G 1993b).

Although the fabrication and recovery operations have ceased, these facilities are still equipped with functioning ventilation/filtration exhaust systems for particulate control. Building air is filtered with several stages of HEPA filters before being discharged into the outside atmosphere. Generally, two stages are used to filter air from former uranium processes, and four stages are used in former plutonium processing areas. The HEPA filters are individually bench tested and certified to be no less than 99.97 percent efficient for a nominal 0.3 μm particle size. Filters are tested for leaks after installation into a filter plenum (EG&G 1993b).

There are currently 133 emissions samplers in 63 air exhaust ducts located within 17 buildings. The samplers are located downstream of the HEPA filter plenum. Particulate samples from each exhaust system are composited into monthly samples for specific laboratory analysis of the plutonium, americium, and uranium isotopes following total long-lived alpha (TLLA) and total long-lived beta (TLLB) activity screening. These samples are also used for beryllium analyses.

6.2.1.1 Selective Alpha Air Monitors

Protection of the environment, the public, and workers from impacts due to the air pathway involves a three-tier approach composed of SAAMs, TLLA, and TLLB particle screening of routine air duct effluent emission sample filters, and radiochemical analysis of individual isotopes collected from air duct effluent emission samples. This approach balances both sensitivity of detection and timeliness of response for each tier.

Thirty-nine SAAMs in the building notification program measure alpha activity in air effluent ducts at RFP and provide real-time notifications. The primary function of the SAAMs is to provide early warning to plant personnel that an alpha release may have occurred. SAAMs initiate visible and audible alarms if the alpha particle activity in the effluent air reaches the plant's internal operating alert levels. These in-stack monitors are positioned downstream of HEPA filter plenums and are set to detect plutonium-239/240. SAAMs are not designed to provide quantitative measurements of routine plutonium concentrations in air effluent, and no data record is maintained for continuous detected count rates. They are the least sensitive, but most timely, of the three tiers of the effluent monitoring program (EG&G 1989). SAAMs are connected to a system in the radiation monitoring offices and selected utilities offices that provides remote alarm, readout, and recording of real-time data when an alarm occurs. These offices are staffed 24 hours a day, seven days a week. SAAM operations and any related QA functions are performed by Radiological Operations and are not the responsibility of the AQD. SAAM operations and QA functions are not intended to meet the monitoring and QA requirements of 40 CFR 61, Subpart H (EG&G 1993b). As previously stated, SAAMs are designed to warn personnel of potential alpha release.

After personal protection equipment has been donned, the following steps are performed when a SAAM alarm indicating off-normal concentrations is activated: (1) the particulate filter is changed and replaced in the affected unit, (2) the alpha detection instrument and alarm are checked for validity, (3) the appropriate RFP staff are notified, and (4) the SAAM particulate filter is analyzed for specific radionuclide isotopes. These procedures are detailed in ROI-5.07, Response to Effluent SAAM Alarm, an RFP standard operation procedure (EG&G 1993b).

6.2.1.2 Particulate Emissions Monitoring

Tiers two and three involve particulate monitoring of filters collected from the 133 in-stack samplers. Currently, particulate emission samplers extract samples in either a subisokinetic or superisokinetic manner. After extensive comparisons between Rocky Flats sampling methodology and EPA methodology, with EPA concurrence, all samplers will be adjusted to operate at a subisokinetic rate of extraction (i.e., in a manner where the linear velocity of the gas entering the sample nozzle is less than that of the undisturbed gas stream at the sample point). This method tends to bias toward the excess collection of large particles (greater than 5 microns) and yields a measured concentration of particles greater than the actual concentration in the duct effluent (EG&G 1993b).

The second tier of duct effluent monitoring involves TLLA and TLLB radioactivity screening of routine particulate samples. Sample filters from continuous routine air sampling of effluents are normally collected twice a week and screened for TLLA and TLLB. Alpha radiation is the principal radiation associated with RFP air effluents. However, naturally occurring, short-lived radionuclides, such as radon decay products, also give off alpha radiation and can contribute to the total alpha activity measured. This contribution can be quantified by taking a count of the samples 24 to 48 hours after collection to allow for the decay of this short-lived radioactivity. The concentration of long-lived alpha emitters is indicative of effluent quality and overall performance of the HEPA filtration system.

TLLA screening is more sensitive than the SAAMs, but can require a minimum of three days for results to become available. Preparation, collection, and disposition of particulate filters follow RFP air quality sampling, standard operation procedure 4-C83-ENV-AQ.03, Effluent Air Radioparticulate Sample Collection. If a sample exceeds the RFP internal emissions action limit of 0.02 picocuries per cubic meter (pCi/m^3), an investigation is initiated to determine the cause of the off-normal concentration and to evaluate the need for corrective action (EG&G 1993b).

TLLB screening provides verification that no significant beta radionuclide emissions are occurring. If a sample concentration exceeds the RFP internal emissions action limit of 0.1 pCi/m^3, an investigation is initiated to determine the cause of the off-normal concentration and to evaluate the need for corrective action.

The third tier of the duct effluent evaluation program consists of compositing the screened samples on a monthly basis and analyzing the composite sample by radiochemical analysis. The radiochemical analysis is the most sensitive measurement available for determining extremely low levels of radioactive isotopes that might be present in duct effluents under routine operations. Because of the cost and time required for sample analysis and because the amount of radioactive material collected on the biweekly sample filter is normally below the detection limit of the radiochemical method, a monthly composite sample is used for analysis rather than the individual biweekly samples. The analysis is time-intensive and is completed approximately six weeks following compositing. The radiochemical analysis of routine effluent monitoring samples is completed for the following radioisotopes: plutonium-238, plutonium-239/240, uranium-233/234, uranium-238, and americium-241. All of these isotopes are listed as COPCs in the *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) list for air (Appendix 3.2). The analysis does not differentiate plutonium-239 from plutonium-240, nor does it differentiate uranium-233 from uranium-234. The procedures followed for these analyses are listed in Table 4-2 of the *Rocky Flats Plant Radionuclide Air Effluent Emissions Monitoring Program Plan* (EG&G 1993b). Effluent monitoring data are reported in RFP's *Monthly Environmental Monitoring Report* (EG&G 1994a), which provides a forum for exchanging and discussing data with public and regulatory representatives. Annual averages are included in the *Rocky Flats Plant Site Environmental Report, January through December 1992* (EG&G 1993c).

6.2.1.3 Gas Monitoring

Tritium is the only gaseous radioactive emission material that is routinely monitored at RFP. Although tritium is typically not generated at RFP, a material shipment was received from another facility in 1973 that, unknown to RFP personnel, was contaminated with this material at another facility. Tritium monitoring was initiated in response to this incident. The monitoring system is designed to detect and quantify potential tritium emissions. Tritium is included in the *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) list for air (Appendix 3.2).

Tritium is monitored at six locations through the collection of tritium in water-filled bubbler impingers located in building effluent systems. Samples are drawn continuously and collected three times per week. Laboratory analyses are conducted on each subperiod sample using liquid scintillation counting of the low energy electrons released from the decay of tritium. The analysis for tritium follows procedure L-7102, Preparation of Effluent Samples for Tritium Analysis (EG&G 1992c).

Before 1989, approximately 23 locations were sampled routinely for tritium. Much of this monitoring was for residual contamination resulting from the 1973 tritium incident. Currently, six air effluent ducts are sampled. The number of sample locations was reduced to six as residual contamination levels were reduced to background or near background levels. Preparation, collection, and disposition of the tritium impinger sample follows procedure 4-C97-ENV-AQ.01, *Rocky Flats Plant Radionuclide Air Effluent Emissions Monitoring Program Plan* (EG&G 1993b).

6.2.2 Nonradiological Emissions Monitoring

Nonradiological emissions monitoring for beryllium is performed at RFP and is described in the following section. VOC emissions are discussed below and in Section 6.2.7.

6.2.2.1 Beryllium

Beryllium is the only nonradiological particulate emission from stationary sources monitored at RFP. Sixty-three filters from stack samplers are continuously sampled for beryllium emissions. Samples are collected from the same filters used for radiological analyses (Section 6.2.1.2). The emission standard for beryllium is a concentration less than 10 grams in a 24-hour period. The total quantity of beryllium discharged from RFP ventilation exhaust systems in 1992 was 3.399 grams (EG&G 1993c). Beryllium is a COPC on the *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) list for air (Appendix 3.2).

RFP's current approach for analyzing monthly continuous composite samples for beryllium is more sensitive than the method specified in Colorado Air Quality Control Regulation No. 8; however the approach is inconsistent with Regulation No. 8. Regulation No. 8 does not require continuous sampling and recommends averaging short-term detected concentrations to calculate emissions for a 24-hour period. RFP beryllium monitoring is performed continuously so that averaging for a 24-hour concentration is not necessary. However, because RFP methods are not identical to state methods, the Air Pollution Control Division of CDH requested that RFP conduct one-time beryllium source tests in the five main beryllium effluent ducts in Buildings 444, 447, and 865 or on the effluent of a new applicable source of beryllium emissions. Because there has been a change in the mission at RFP, former beryllium operations are not expected to restart, and the source tests will not be scheduled. The potential for beryllium emissions is still present; however, during building cleanup operations or as part of the facility characterization, appropriate stack monitoring will be implemented for new sources having the potential to emit measurable levels of beryllium.

6.2.2.2 Volatile Organic Compound Emissions

VOC emissions in building effluent are not currently monitored by EG&G at RFP. However, VOC emissions are estimated from chemical inventories and quantities used, and these emissions are reported in the Air Pollution Emission Notices (APENs). APENs are discussed in Section 6.2.7. The RFP Waste Technical Support Group monitors VOC concentrations at appropriate tanks and piping for RCRA permit compliance.

The Industrial Area includes the following VOC sources:

- building stacks and ventilation systems from VOC process and storage areas;
- outdoor solvent and fuel tanks;
- painting operations;
- maintenance operations;
- treatment, storage, and disposal facilities;
- vehicle emissions and other combustion sources; and
- volatilization from surface soils and sediments.

A VOC emission study completed at RFP is described in Section 6.3. VOCs are listed as potential air contaminants in the *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) list for air (Appendix 3.2).

6.2.3 Radiological Ambient Air Monitoring Programs

The integrated Radiological Ambient Air Monitoring Program (RAAMP) includes general RFP and the OU-specific special air quality monitoring programs; the samplers are similar but the rationales for sampler location and use differ between the programs.

The CDH Radiation Control Division Surveillance Program monitors ambient air concentrations of long-lived gross alpha and gross beta radioactivity, as well as plutonium-239/240, uranium, and americium-241 in suspended particulate material. These measurements are made on samples collected from 13 samplers numbered D1-11, D13, and E-1, as shown in Figures 6-1 and 6-2. Analytical results are summarized in the CDH Environmental Surveillance Report distributed at the Monthly Environmental Monitoring Information Exchange Meetings.

6.2.3.1 Radioactive Ambient Air Monitoring Program

The objectives of the RAAMP samplers are to monitor the dispersion of airborne radioactive materials from RFP into the surrounding environment and communities and to establish baseline concentrations, as required by DOE Order 5400.1. Data collected are used to determine public inhalation dose and are compared with the DOE standard for exposure for all pathways from routine plant operations. Forty-seven locations at RFP and nearby communities are sampled continuously. The Industrial Area is monitored using 22 samplers; 14 samplers are located on the plant perimeter, and 11 are located in the communities. Nineteen of the Industrial Area samplers are located within or at the Industrial Area fenceline. The remaining Industrial Area samplers are located less than 1 mile from the Industrial Area fence. Perimeter samplers are located between 2 and 4 miles from the plant's center.

RFP and CDH perimeter and Industrial Area samplers are shown in Figures 6-1 and 6-2. These figures show existing and proposed RAAMP sampler locations. RAAMP samplers are designated with an S (existing sampling location), N (new site/location), or C (sites with co-located samplers) followed by a number. The CDH sampler locations are designated with an X (perimeter sites with multiple parameter sensors), D (standard high-volume samplers for collection of radiological particulates), or E (elevated

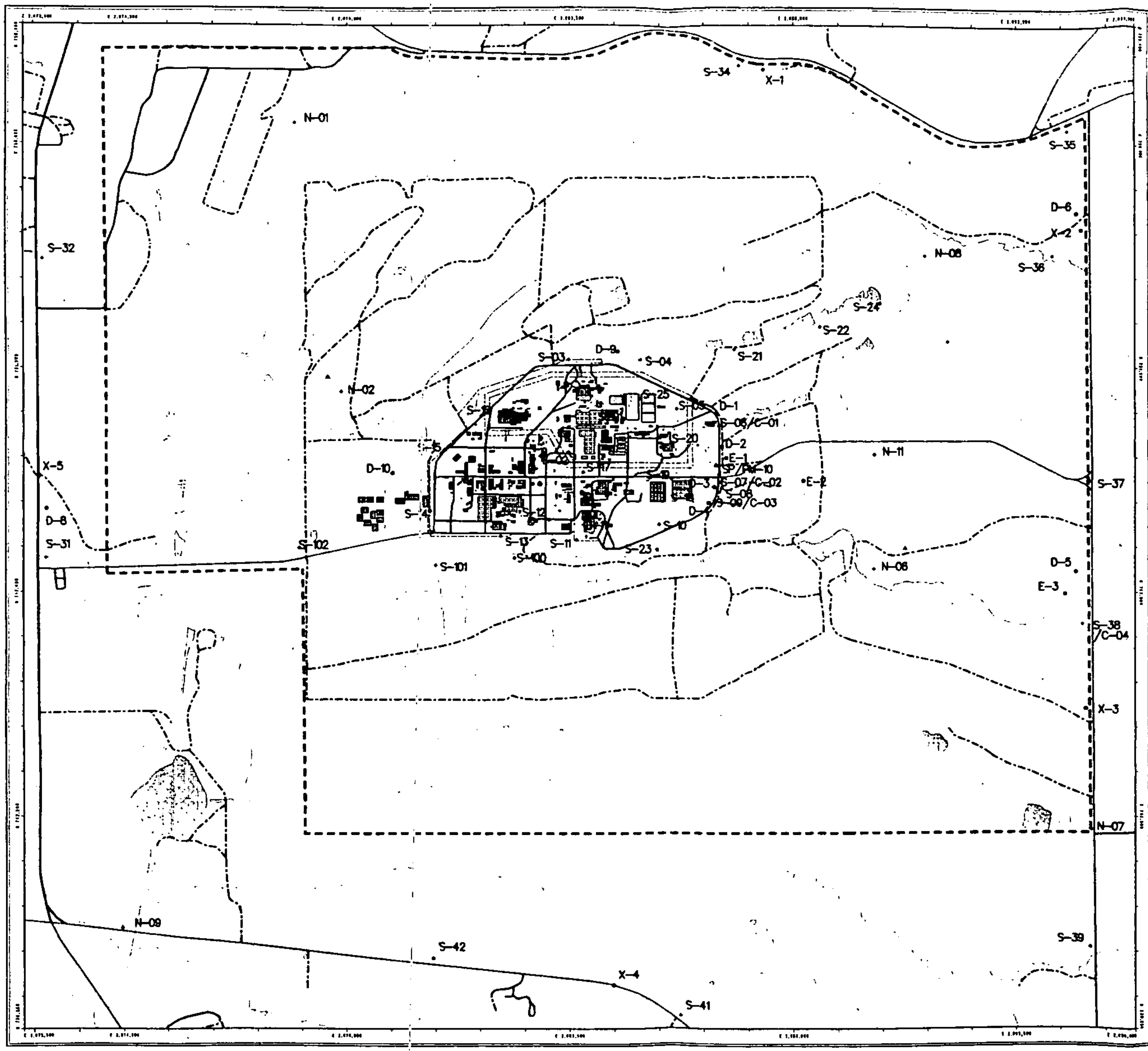


FIGURE 6-1

Industrial Area IM/IRA/DD Air Sampling Stations at Rocky Flats Plant

Explanation

- Buildings or other structures
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences
- Rocky Flats boundary
- Heavy duty paved roads
- Medium duty paved roads
- Light duty paved roads
- Dirt roads
- 61 Meter Meteorological Tower
- Proposed Meteorological Tower
- RFP TSP/PM-10 Sampler
- CDH Air Samplers
  D,E = Particulate and Radiological Ambient Air Sampling Stations
  X = VOC, NOx, particulate, radionuclide and metals sampling stations
- RFP Radiological Ambient Air Sampling Stations

Locations S-05, S-07, S-23 and S-16 are recommended for VOC monitoring.

U.S. Department of Energy
Rocky Flats Plant

Prepared by:
EG&G ROCKY FLATS
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

MAP ID: [illegible] November 16, 1994

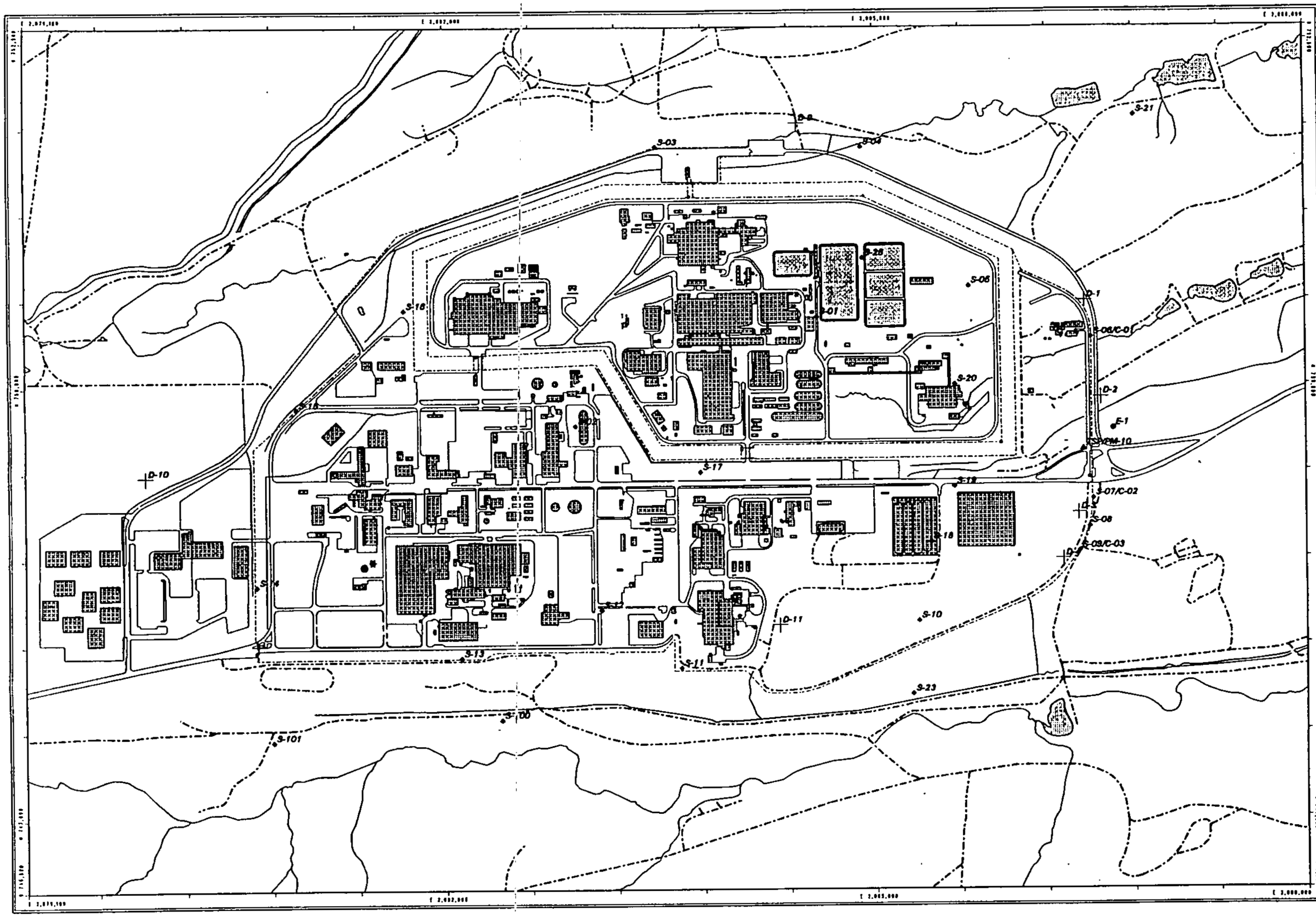


FIGURE 6-2

Industrial Area IM/IRA/DD Air Sampling Stations in the Industrial Area

Explanation

- Buildings or other structures
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences
- Paved roads
- Dirt roads
- RFP TSP/PM-10 Sampler
- CDH Air Samplers
  D,E = Particulate and Radiological Ambient Air Sampling Stations
  X =VOC, NOx, particulate, radionuclide and metals sampling stations
- RFP Radiological Ambient Air Sampling Stations

Locations S-08, S-07, S-23 and S-16 are recommended for VOC monitoring.

U.S. Department of Energy
Rocky Flats Plant

Prepared by:
EG&G ROCKY FLATS
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

MAP ID: [illegible] November 15, 1994

(intentionally blank)

multilevel platforms collecting radiological particulates) followed by a number and are instrumented with radionuclide samplers.

RFP samplers collect air particulates on 20- by 25-centimeter fiberglass filters. Manufacturer's test specifications rate this filter medium to be 99.97 percent efficient for relevant particle sizes under conditions typically encountered in routine ambient air sampling. Filters are collected from the samplers biweekly, composited by location, and analyzed monthly for isotopic analysis at the RFP laboratory. All filters are analyzed for plutonium-239/240 (EG&G 1993c).

EG&G is currently upgrading the sampler network and is replacing existing RAAMP samplers with RFP-designed and commercially constructed high-volume samplers. The *Assessment and Integration of Radioactive Ambient Air Monitoring at Rocky Flats Plant* document (EG&G 1993a) details planned revisions to the ambient air monitoring program including sampler design, location, and rationale for recommendations. Some RAAMP sampler locations will change, and the entire RAAMP sampler numbering system will be updated. Figures 6-1 and 6-2 present selected proposed locations for RAAMP samplers, existing sampling sites, and locations that will have co-located existing and new samplers. Locations may be revised based on the minor revisions to the *Assessment and Integration of Radioactive Ambient Air Monitoring at Rocky Flats Plant* (EG&G 1993a) or funding may change the number and/or location of samplers that are ultimately installed. Table 6-1 lists the existing and proposed RAAMP network sampler numbers.

Community Radiation Monitoring Program. The RFP Community Radiation Monitoring Program (ComRad) is a cooperative effort of the DOE, EG&G Rocky Flats, Inc., and the communities surrounding RFP. ComRad involves citizen-operated environmental air surveillance stations (EG&G 1992b). The citizen operators are technically trained members of the teaching community. One ComRad station is located in each of the cities of Broomfield, Arvada, Westminster, Northglenn, and Thornton. Each ComRad

TABLE 6-1
Industrial Area IM/IRA/DD
RAAMP Sampler Numbering System

Before 1994	1994	
S-01	S-101*	East of Bldg. 778 (SW edge of Solar Pond 207A)
S-02	S-102	East of Bldg. 549
S-03	S-103	North of Bldgs. 371/374 on perimeter road
S-04	S-104	North of Solar Pond 207C on perimeter road
S-06	S-106	East of wastewater treatment plant (co-located with S-006)
S-07	S-107	South of east gate guard shack (co-located with S-007)
S-09	S-109	0.1 mile south of east guard shack (co-located with S-009)
S-10	S-110	Halfway between Bldg. 881 and east gate guard shack (SW of 904 pad)
S-12	S-112	NE corner of Cedar Ave. and 7th Street (RFP)
S-16	S-116	West of Bldg. 371 (outside of Protected Area)
S-19	S-119	Intersection of Central and 903 asphalt road
S-21	S-121	Intersection of the A ponds access road and perimeter road
S-23	S-123	SW of 904 pad, on the buffer zone road
S-25	S-125	Between Solar Ponds 207A and 207B (moved one pole south)
S-31	S-131	NE corner of Highway 93, 1.3 miles north of S-131
S-32	S-132	East of buffer zone, inside gate P-15, west side of Indiana St.
S-34	S-134	One pole west of CDH Air Sampling Station on south side of Hwy. 128
S-36	S-136	East of buffer zone, inside gate P-15, west side of Indiana St.

TABLE 6-1
Industrial Area IM/IRA/DD
RAAMP Sampler Numbering System

Before 1994	1994	
S-37	S-137	NW corner of intersection of Indiana St. and east access road
C-04	S-138	West side of Indiana St., 0.8 mile south of east access road (co-located with S-038)
S-40	S-140	Intersection of Indiana St. and Hwy. 72
S-41	S-141	North side of Hwy. 72, 1.3 miles west of Indiana St.
S-42	S-142	North side of Hwy. 72, 2.9 miles west of Indiana St.
S-54	S-154	Boulder, east of Curie Circle, across from Bldg. 25 in NIST complex
S-58	S-158	Wagner station (south of 96th on Alkire)
S-68	S-168	SW corner of the intersection of 100th Ave. and Simms
N-01	S-201**	SE of the Wind Site, across access road
N-02	S-202	South of the meteorological tower west of plant site
S-100	S-205	South of the 400 buildings in the Woman Creek drainage (at temporary OU sampler 100 location)
S-101	S-204	South of Bldg. 131 in the Woman Creek drainage (at temporary OU sampler 101 location)
S-102	S-203	0.25 mile west of T-130 trailer complex, north side of road (at temporary OU sampler 102 location)
N-06	S-206	East of Pond C-2 (in buffer zone)
N-07	S-207	West side of Indiana St. (across from nearest residence)
N-08	S-208	NE of Pond A-4 (in the buffer zone)
N-09	S-209	North side of Hwy. 72, 0.4 mile east of Hwy. 93
N-10	S-210	100 feet north of 108th and Simms (west side of Simms)

TABLE 6-1 FINAL

Industrial Area IM/IRA/DD

RAAMP Sampler Numbering System

Before 1994	1994	
N-11	S-211	CDH sampling platform along east access road (east edge of IHSS 216.3 [OU2])
C-01	S-006***	East of wastewater treatment plant (co-located with S-106)
C-02	S-007	South of east gate guard shack (co-located with S-107)
C-03	S-009	0.1 mile south of east guard shack (co-located with S-109)
S-38	S-038	West side of Indiana St., 0.8 mile south of east of access road (co-located with S-138)

NIST = National Institute of Standards and Technology
* 100 = New samplers at existing locations
** 200 = New samplers at new locations
*** 000 = Existing samplers (co-located with new samplers)

sampling station is equipped with a RAAMP-type sampler, a gamma detector, a thermoluminescent dosimeter, and meteorological monitors. Analysis of the community high-volume air filters is performed by EPA Environmental Monitoring Sciences Laboratory in Las Vegas, Nevada. Analysis previously had been performed at RFP by EG&G Rocky Flats, Inc. All reported ComRad data measurements are consistent with other regional offsite measurements that have been obtained in the past (CDH 1993a). ComRad results are published on a monthly basis and are available at Monthly Environmental Monitoring Information Exchange Meetings coordinated by CDH and RFP.

6.2.3.2 Operable Unit-Specific Air Quality Monitoring

The OU-specific air quality monitoring program was designed to comply with ambient environmental air sampling requirements in conjunction with remediation work plans at contaminated sites at the plant. The *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) and EG&G's *Environmental Management Division Operating Procedures* (EG&G 1992c) describe requirements and procedures for suspended particulate monitoring. Environmental investigations will be conducted at 16 OUs. Monitoring program design will depend on planned activities, potential exposure pathways, and the contaminants of concern. The program will be designed to monitor for worker protection and to measure concentrations leaving the work area. Any soil disturbance, such as monitoring well installation or test pit excavation, could result in release of material to the air medium. OU-specific human health evaluations include characterization of contaminants, potential exposures, and potentially exposed populations to determine what risks need to be reduced or eliminated and what exposures need to be prevented.

The *Assessment and Integration of Radioactive Ambient Air Monitoring at Rocky Flats Plant* (EG&G 1993a) presents the investigation and recommendations necessary to implement the ambient particulate sampling program and to ensure proper coverage of all site activities. The intent of this program is to reduce the need to establish high-maintenance special samplers.

The IAG (DOE 1991b) defines regulatory requirements for the OU-specific monitoring program. Four high-volume air samplers were operated at OU1 before and during remediation activities. Work at OU1, including operation of the samplers, ceased in September 1993. Special samplers were also installed at OU5 (station numbers S-100, S-101, and S-102, shown in Figures 6-1 and 6-2) and were operated through September 1994. The monitoring program included high-volume ambient samplers that were operated continuously. Sampler filters were collected from all OU5 sampling locations biweekly, composited monthly by location, and routinely analyzed for uranium-234, uranium-238, plutonium-239/240, and americium-241.

Special air monitoring has been proposed for OU3, but the system has not been established. Three ultrahigh volume sampler locations with operating flow volumes of 500 to 600 cubic feet per minute are under consideration for this system. One meteorological monitoring station will be installed at OU3 to provide site-specific data for dispersion modeling and risk assessments applicable to OU3 and useful for the entire RFP.

In addition to air quality sampling, radioactive particle concentrations are estimated indirectly by continuous, real-time monitoring for respirable particle concentrations using instruments and dosimeters that are not part of the permanent, integrated ambient air sampling program. This sampling and concentration estimation is performed for worker protection; however, this estimation is not performed routinely and has limited sensitivity. This monitoring is not performed for or by the RFP AQD.

6.2.4 Nonradiological Ambient Monitoring

Ambient particulates are regulated by EPA and CDH under the Clean Air Act (CAA) and its amendments, as defined by the National Ambient Air Quality Standards (NAAQS) and Colorado Air Quality Control Commission Ambient Air Standards. Both TSP and PM-10 are monitored by RFP at one nonradiological particulate air sampling location. Two PM-10 and two TSP samplers are located at this one monitoring station. PM-10 replaced TSP as the EPA-designated reference method (40 CFR 50.6) for ambient particulate matter, but TSP sampling has been continued because the results have several applications. Sampling for a broad particulate size range serves the following purposes: (1) internal management tool, (2) baseline data record, and (3) cross-comparisons with nonroutine, ambient radiological particulate sampling studies.

The commercially available air samplers operate at a volumetric flow rate between 1.1 and 1.7 cubic meters per minute, entraining particle sizes up to 50 microns in diameter on the filter surface of the TSP unit and respirable fractions less than 10 microns for the PM-10 sampler. Samplers are operated on a standard statewide sampling schedule of one day every sixth day. Siting for the samplers follows *EPA Guidelines for Air Quality Monitoring Network Design and Instrument Siting* (EPA 1975).

RFP procedure AP.09, Ambient TSP and PM-10 Air Particulate Sampling High-Volume Method, provides details on sampling methods for ambient particulates. This procedure follows guidelines established in the *EPA Quality Assurance Handbook for Air Pollution Measurement Systems* (EPA 1983).

The CDH Air Pollution Control Division Surveillance Program maintains monitors that are instrumented to measure NO_x, suspended particulate material (TSP and PM-10), metals, and VOCs in air at RFP (locations labeled with a D, E, or X in Figures 6-1 and 6-2). Nitrogen oxides are monitored at sampler X-3 only. RFP does not have a program to monitor VOC concentrations in ambient air. CDH maintains three ambient air monitoring stations east and northeast of the Industrial Area that monitor VOC concentrations (Figure 6-1). The CDH stations are identified with an "X" prefix. Samples are analyzed in the CDH laboratory using EPA Method TO-1. Analytical results are summarized in the CDH Environmental Surveillance Report distributed at the Monthly Environmental Monitoring Information Exchange Meetings. To date, only a limited number of VOC species have been detected at these sites, including compounds common to large urban areas.

6.2.5 Emergency Response

The *Rocky Flats Plant Emergency Plan* (EPLAN) (EG&G 1993e) establishes the planning, preparedness, and response concepts for emergencies at the facility. Response measures provide protection for the health and safety of onsite personnel and the public, limit damage to facilities and equipment, minimize impact to onsite operations and security, and limit adverse impacts on the environment. The EPLAN also outlines the interfaces and coordination with offsite federal, state, local, tribal, and private agencies, governments, and organizations regarding emergency response.

The *Rocky Flats Plant Air Quality Management Plan* (EG&G 1992b) summarizes the RFP emergency preparedness response capabilities and activities from an air quality programs perspective. A site-specific dispersion model, the Terrain-Responsive Atmospheric Code (TRAC), was developed by RFP to predict plume path and impacts in a region of complex terrain and rapidly changing meteorology with sufficient accuracy to support protective action decisions by managers during emergency situations. The TRAC model is continuously operated by the Emergency Preparedness Offsite Programs group of the Safety, Safeguards, and Security Department and includes data inputs from numerous regional meteorology stations. The model supports a variety of missions including emergency response, emergency planning, risk assessment, hazards analysis, and DOE regulatory compliance. The Emergency Operations Center (EOC) has used a version of the TRAC model to produce more than 15,000 automatic plume projections. The model estimates plume path, concentration, and dose (EG&G 1992b).

RFP also uses the DOE atmospheric release advisory capability (ARAC) model, which is a real-time emergency response system designed to assess the potential for field impacts of a radioactive material release to the air (typically beyond 30 miles). Meteorological data are assessed from the event site, with surrounding regional data obtained from the Air Force Global Weather Center. ARAC can be used to produce contour patterns showing the location and levels of surface contamination as well as the potential radiation dose to people in the area as a result of exposure to the radioactive release (EG&G 1992b). Nonemergency response dispersion models are discussed in Section 6.3. A nonradiological chemical module is planned as a 1995-1996 upgrade.

RFP is implementing a Chemical Tracking and Control System (CTCS) to track all chemicals entering the plant site to support an air quality emissions inventory and impending requirements of the federal CAA Title V and the Emergency Planning and Community Right-to-Know Act, Section 302, SARA Title III. This program, combined with the Waste and Environmental Management System (WEMS) (described in Section 3.0), will provide a real-time chemical material balance and inventory for RFP. Inventory data will be housed in a Virtual Address Extension (VAX) mainframe computer and will use an ORACLE relational database. The CTCS also provides on-line MSDS capability that can be used to provide timely information to nearby communities and emergency response personnel in the event of an emergency. The CTCS will also be useful for emergency planning and preparedness, APENs submittals, and other environmental reports (EG&G 1992b).

6.2.6 Meteorological Monitoring

The purpose of the site meteorological monitoring program is to provide information for use in assessing the transport, diffusion, and deposition of emissions actually or potentially released into the atmosphere by plant operations. Meteorological data are also used to support the design of environmental monitoring networks for impact assessments, environmental surveillance activities, remediation activities, and emergency response (EG&G 1992a).

Both EPA and DOE require that representative meteorological data be used for dispersion modeling. Meteorological data have been collected at RFP since 1953, but high-quality data needed for air dispersion modeling were not collected before 1987. EPA considers a five-year database standard for adequate long-term assessment of air quality impacts at a given site (CDH 1993b). Data are collected on a 61-meter tower in the west buffer zone (Figure 6-1). Instrumentation is attached to the tower at 10 meters, 25 meters, and 60 meters. The real-time data collected from the towers include horizontal wind speed and direction, vertical wind speed, ambient air temperature, dew point temperature, and solar radiation. Precipitation and atmospheric pressure are measured at ground level. A redundant, instrumented, 10-meter tower is located about 100 meters northeast of the

61-meter tower and provides a separate database. Horizontal and vertical wind speed, temperature, relative humidity, and precipitation are measured at the 10-meter tower.

Meteorological data are taken twice a second by data loggers and compiled into 15-minute intervals, 24 hours a day, seven days a week. Data logger units at the base of the 61-meter and 10-meter towers digitize incoming data, provide 15-minute averages of all parameters, and store values in internal solid-state memory. The units also calculate parameter statistics such as average, standard deviation, and maximum and minimum values for each variable. The data loggers at both towers are connected via radio to the RFP Emergency Assessment Facility (EAF). The towers are inspected weekly and are inspected immediately if suspicious data are recorded. Tower instrumentation is calibrated every six months (EG&G 1992a).

Computer programs are used to store meteorological data in the required format; check the validity of data; update, correct, or delete data; store validated data; and provide access to validated data. Each week a portion of data is randomly selected and compared to data from other meteorology stations in the metropolitan area. Computer programs have also been developed to generate descriptive statistics and wind frequency tables. Wind frequency statistics are used to create wind roses. Stability classes are compiled using vertical velocity data (EG&G 1992a).

Two meteorologists work overlapping shifts and prepare forecasts four times a day during normal conditions and more frequently during severe or emergency conditions. Weather forecasting supports emergency response, plant health and safety, and plant operations.

Future meteorological monitoring plans include reinstrumenting the existing 61-meter tower and the potential construction of a new 150-meter tower southeast of RFP at the mouth of the Woman Creek drainage to support remediation activities and emergency response. A 10-meter tower will also be located within OU3 boundaries to support remedial investigation activities. A joint effort by CDH, Air Pollution Control Division (APCD), and RFP will reinstrument some of the CDH air stations for meteorological monitoring. A Doppler Acoustic sounder, capable of measuring winds, turbulence, and stability up to 1 km above the ground, is planned for installation in the buffer zone. These data will support regulatory modeling and emergency response (EG&G 1992b). Purchase of a forecasting workstation, the Real-Time Environmental Applications Product (REAP), was completed in 1994. This system would provide detailed local and national weather information.

6.2.7 Air Pollution Emission Notices

APENs are required by Colorado Air Regulation No. 3 for all three potential sources of air pollutants (criteria, hazardous, toxic) resulting from construction or alteration of any facility, process, or activity from which air pollutants may be emitted. In addition, air emission permits are required for sources that have the potential for significant impact on air quality unless specifically exempted by law. A baseline emission survey was performed at RFP in 1990 and 1991 (EG&G 1992b). This survey identified sources that require APENs and air emission permit applications. A list of potential VOC sources in the Industrial Area was provided in Section 6.2.2. Approximately 240 individual APENs reports have been submitted to CDH since 1989. These documents include building and process descriptions, raw material usage and characterization, stack and venting information, and air pollutant types and quantities (EG&G 1992b). Updates to RFP APENs reports for criteria pollutants were submitted to CDH in December 1992 and for hazardous pollutants in December 1993.

6.2.8 Stratospheric Ozone Protection

A complete phase-out of chlorofluorocarbon, halon, and carbon tetrachloride use is required under the 1990 CAA amendments. Section 4.4 of the AQMP describes AQD activities designed to meet these requirements.

6.2.9 Air Pollution Prevention and Fugitive Emissions Control - Interagency Agreement Programs

The pollution prevention and fugitive emissions control program is an important part of the RFP remediation projects air quality program. The *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) was prepared by DOE, Rocky Flats Office (RFO) Environmental Restoration Division (ERD), as required by the IAG under Attachment 2, V (DOE 1991b), and approved by CDH and EPA. In general, the *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) was developed to ensure that the public is protected from the potential increased health risk associated with inhaling windblown hazardous or dangerous constituents during RFI/RI and IM/IRA activities at RFP, specifically OU-specific environmental investigations. The two primary functions of the *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) are to (1) provide a management plan to prevent airborne transport of hazardous or dangerous materials and (2) propose an evaluation of the potential for and risk of windblown contaminants from RFP. The *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) includes specific procedures that (1) establish soil contamination threshold levels, (2) determine the dust emission mitigation required when concentrations are in excess of the thresholds, and (3) establish a monitoring program that will evaluate the effectiveness of dust control measures.

Risk-based soil thresholds for contaminants are derived as a function of activity to be conducted and distance from the site boundary. The application of these soil thresholds is based on public protection criteria; however, implementation of the required control measures and airborne monitoring will ensure that the workers are protected as well.

The *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) presents criteria for designating intrusive RFI/RI or IM/IRA activities at site locations as Stage 1 or Stage 2. Activities conducted under Stage 1 are performed at site locations that have soil data that indicate contaminant concentrations do not exceed the established soil thresholds. The Stage 1 contaminant dispersion control measures will include establishing wind speed thresholds, water spray soil applications, waste pile covering, and general administrative control measures such as vehicular speed limitations. The effectiveness of such controls will be measured by occupational health and safety real-time particulate and vapor monitors, soil moisture gauges, and anemometers.

Activities conducted under Stage 2 are performed at locations where RFI/RI intrusive activities, such as IM/IRAs, will require additional preventive measures and airborne contaminant monitoring. For additional preventive measures, the Stage 2 dispersion control measures will consist of Stage 1 methods plus additional suppression techniques such as extensive wetting, wind screens, spray curtains, or paving. The selection of any particular technique will depend on the activity performed and the effectiveness and/or implementability of the technique under consideration. Airborne contaminant monitoring, in addition to real-time monitoring, provides an integrating record of the dust concentrations during the work activities. The *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) recommends that site-specific implementation plans and monitoring programs be developed to verify proper execution and effectiveness of the control measures applied.

The *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) uses simple airborne exposure and risk assessment techniques to evaluate the effectiveness of dust control measures. An emission model is used to predict the rate at which contaminants are released into the air from a source, and a dispersion model predicts associated concentrations in air at receptor points. A complete modeling set may be used to evaluate the potential for offsite impacts resulting from intrusive activities and as a guide in the selection of appropriate dust control measures.

Although the *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) is an essential tool for RFP remediation programs, it is the combination of many controls and programs administrated by RFP organizations that prevent releases from RFP facilities and property.

RFP controls and programs include, but are not limited to, the following:

- HEPA filtration;
- nuclear safety programs;
- radiological engineering programs; and
- the integrated work control program (IWCP).

6.2.10 Quality Assurance

The Environmental Protection and Environmental Restoration QA Programs were developed to establish QA requirements applicable to RFP environmental programs. The Environmental QA Program was implemented in May 1991 and updated and streamlined in 1993. The resulting *Environmental Protection Management Plan* (EPMP) (EG&G 1993f) is applicable to all environmental protection program activities. The EPMP describes requirements, methods, and responsibilities for achieving and assuring quality for management, staff, and subcontractors. The EPMP specifies those administrative and technical procedures needed to implement the applicable quality requirements of the RFP QA program (EG&G 1993b). The Quality Assurance Program Description (QAPD) (RFP/ER-MP-QAPD, Rev. 1) (EG&G 1992d) identifies the QA requirements applicable to ER project activities, which includes D&D. The Environmental Restoration Management (ERM) QA program consists of the QAPD, the Quality Assurance Project

Plan (QAPP) (EG&G 1994b), the RFP Quality Assurance Manual, ERM Administrative Procedures (EG&G latest version a), and ERM Operating Procedures (EG&G latest version b). Additionally, the *Air Quality Division Management Plan* (EG&G 1994c) summarizes the QA program developed by the AQD. Further details concerning *Environmental Protection Management Plan* QA requirements for RFP radiological effluent emissions monitoring program may be found in the *Draft Rocky Flats Plant Radionuclide Air Effluent Emissions Monitoring Program Plan* (EG&G 1993b) or the *Environmental Protection Management Plan* (EG&G 1993f).

The *Environmental Monitoring Plan* (EG&G 1992a) and the *Rocky Flats Plant Air Quality Management Plan* (EG&G 1992b) describe QA procedures for monitoring equipment use, calibration and maintenance, sample collection, and sample analysis for monitoring performed by RFP and EG&G.

RFP ER Department OU-specific activities (e.g., *Plan for Prevention of Contaminant Dispersion* [DOE 1991a]) follow QA programs developed specifically with CERCLA (EPA) programs in mind, and the *Quality Assurance Project Plan* is the primary implementing document.

6.3 SUMMARY OF AVAILABLE DATA AND DISPERSION MODELS

All CDH air quality monitoring data are tabulated on a monthly basis and published by CDH in the Environmental Surveillance Report for distribution to the public. Data from CDH VOC samplers are also summarized in this report. RFP air quality monitoring data are reported in the RFP *Monthly Environmental Monitoring Report* (EG&G 1994a). These data are also summarized on an annual basis and included in the *Rocky Flats Plant Site Environmental Report* (EG&G 1993c). A summary of 1988 to 1992 RFP monitoring data is provided in Figure 6-3. Data collected as part of the special OU monitoring program are included in each OU RI report.

FIGURE 6-3
INDUSTRIAL AREA IM/IRA/DD
Summary of Rocky Flats Plant Air Monitoring Data
1988-1992

FINAL

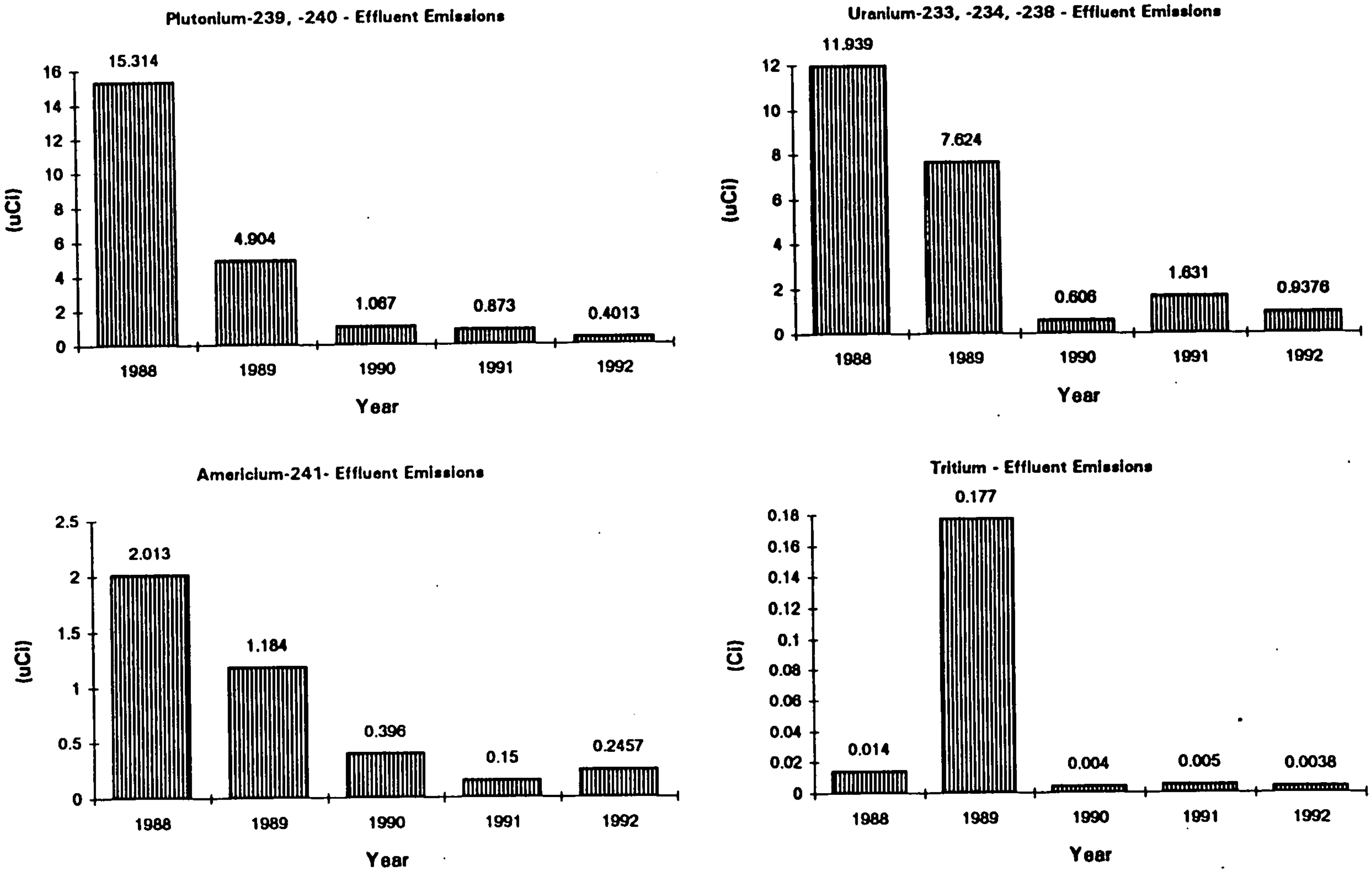
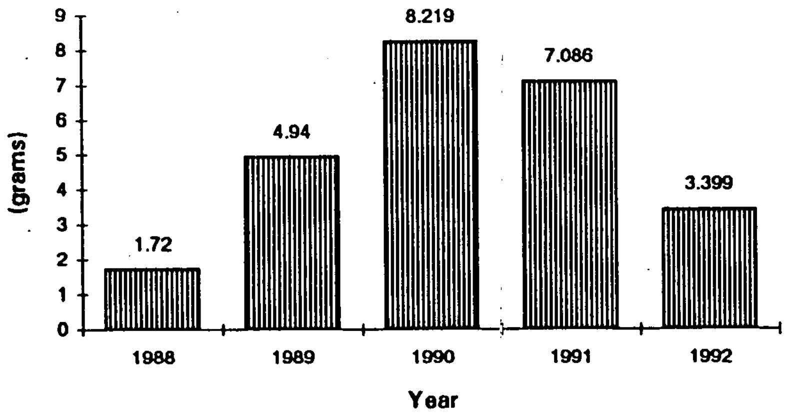


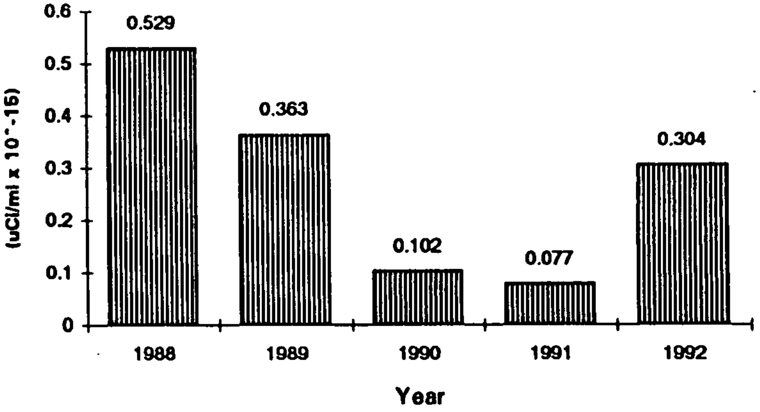
FIGURE 6-3 (continued)
INDUSTRIAL AREA IM/IRA/DD
Summary of Rocky Flats Plant Air Monitoring Data
1988-1992

FINAL

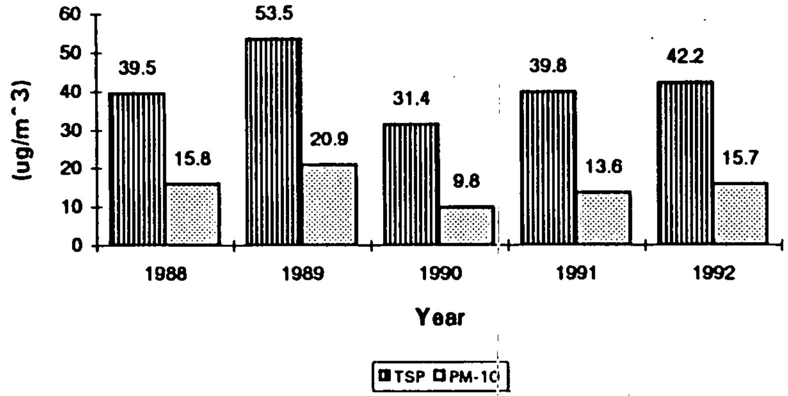
Beryllium



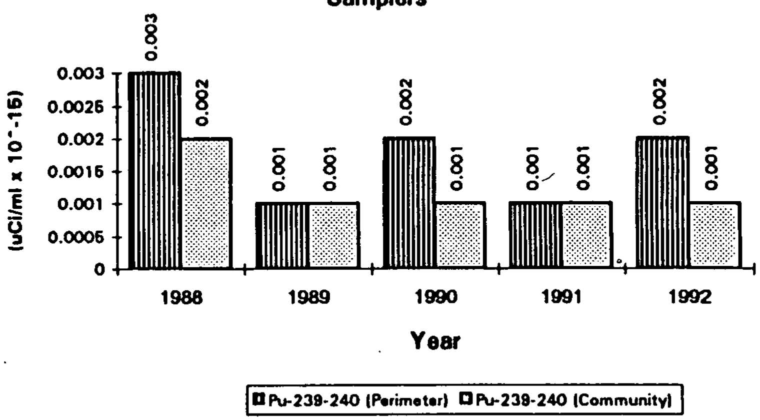
Plutonium-239, -240 Onsite Samplers



TSP and PM-10



Plutonium-238, -240 - Perimeter and Community Samplers



uCi = microcuries
Ci = curies

g = grams
ml = milliliters

ug/m^3 = micrograms per cubic meter
uCi/ml = microcuries per milliliter

Air quality data are accessible through RFEDS. The system contains data from the Radioactive Effluent Air Monitoring Program and RAAMP network and may be used to assist in characterizing RFP airborne radioactivity. Because no routine nuclear weapons-related processing has occurred since 1989, reported radionuclide point-source effluent emissions are believed to be a result of resuspended residual radioactive material in the ventilation systems. Handling of radioactive material at RFP currently involves material consolidation, waste processing, and analytical operations. Most of the total radionuclide air emissions are from diffuse/fugitive area sources associated with past spills or releases (EG&G 1993b).

Air dispersion models are used for design of monitoring plans, air quality analysis, emergency response, and to estimate contaminant concentrations. Models that are applied to emergency response issues were discussed in Section 6.2.5. OU-specific air dispersion data have been generated by organizations other than EG&G's EPM, but these data were not reviewed for this evaluation.

The following air dispersion models were used by ChemRisk to predict contaminant concentrations associated with the routine release of contaminants from the filter plenum exhaust and from accidental releases: Industrial Source Complex (ISC) model, Fugitive Dust Model (FDM) and Integrated PUFF (INPUFF) model. Results were reported in *Project Task 6, Exposure Pathway Identification and Transport Modeling* (CDH 1993b). The predicted offsite air concentrations were used in *Project Task 8, Dose Assessment for Historical Contaminant Releases from Rocky Flats* (CDH 1993c) to reconstruct doses received by the offsite public. The TRAC model could not be used to predict concentrations from past emissions because detailed meteorological data were not available for the historical events of concern.

The CAP88-PC dispersion model (40 CFR 61.93) is used by RFP to calculate radiation doses to determine compliance with EPA's CAA NESHAP limits for air emissions of radioactive materials. Dose calculations are summarized in the annual air emission report provided to EPA. The required contents of the report are specified in 40 CFR 61.94 (EG&G 1993b).

A special project using computer dispersion modeling of major sources of VOCs from buildings was initiated to provide design information for establishing an ambient VOC monitoring network. An EPA air dispersion model (ISC2) was chosen to evaluate VOC plume movement on the plant site, buffer zone, and surrounding communities. The analysis used current onsite and regional meteorology as well as production source emission estimates of building VOC releases obtained from engineering evaluations. Because the mission of the facility has changed since the dispersion modeling project was initiated (i.e., major VOC sources are not active), and because the scope of the project was limited, the VOC monitoring program recommendations were not implemented. CDH has conducted its own siting study for RFP fence-line monitoring and has installed three monitoring stations (X-1, X-2, and X-3, as shown in Figure 6-1), with two additional sites planned. These stations are equipped to measure ambient VOC concentrations and other parameters.

6.4 PATHWAYS ANALYSIS

~~Potential transport pathways associated with sources of air contamination at RFP include~~ (1) routine effluent emissions from process building exhaust stacks and ventilation systems; (2) volatilization from surface water and soils, recent and historical releases, and vehicle emissions; (3) fugitive dust from deposition of contaminants from previous emissions and historical releases; and (4) erosion and suspension of particles from previous emissions, historical releases, surface water runoff, and sediments.

Potential movement of contaminants (particles) by wind is possible wherever contaminated soils exist. The likelihood of airborne contamination increases greatly if the site is disturbed by traffic or soil excavation. Dust-borne contaminants mobilized by wind have been documented in some areas of RFP (DOE 1992).

Some releases involving constituents such as VOCs, while affecting air quality for a time near the release, typically do not spread. However, organic vapors emanating from soils in the vadose zone can serve as an indicator of subsurface releases and potential soil contamination (DOE 1992).

Contaminant classes that may be present in air at RFP include organic solvents, inorganics (specifically beryllium and acids), and radiological particles.

6.5 EVALUATION OF MONITORING PROGRAM AND ADDITIONAL DATA NEEDS

The existing ambient air quality and meteorology monitoring program provides important records of historical trends, establishes baseline conditions, and may be used to characterize major deviations in concentrations that could result from D&D or remedial actions. Because most of the data are not collected on a real-time basis, site-specific samplers will probably be required to monitor changes resulting from individual remedial or D&D activities. However, real-time air sampling with detection capability sensitive enough to detect low radionuclide concentrations is not technically feasible.

There is a need for baseline measurements of ambient VOC concentrations. During 1994, CDH is planning to install two additional ambient VOC samplers on the west and south sides of the facility, as shown in Figure 6-1 (X-4 and X-5). These locations were selected using computer models to predict plant emissions. Startup of the new CDH stations has not been scheduled. The analytes for CDH's VOC monitoring program include some chemicals not currently used or stored at the facility. The CDH samplers will provide information about VOC concentrations in air leaving and entering RFP. VOC concentrations are not measured by EG&G within or near the Industrial Area.

For radiological and particulate monitoring, the frequency of sample collection and analysis for the RAAMP program is more than adequate for dose calculations and air dispersion modeling.

Attachment A.1.2 of the *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) is a list of potential contaminants selected based on the inhalation exposure pathway and constituents for which accepted inhalation reference concentration (RfC) and unit risk factors were available (Appendix 3.2). This list includes several metals and VOCs that are not currently monitored for in the Industrial Area as part of the RFP air quality monitoring program. Baseline air concentrations for these constituents have not been established. Appendix 3.2 identifies the universe of COPCs that may currently, or in the past, have been associated with RFP operations. As discussed in Section 3.0, as each D&D activity is defined, COPCs will be identified for the specific activity. Baseline data collection will be targeted for the specific list of COPCs that are identified for each D&D activity, and COPCs will be evaluated using the methodology described in Section 9.4.

6.6 AIR MONITORING TECHNOLOGIES ASSESSMENT

The goal of the IM/IRA air monitoring assessment was to identify new technologies and instrumentation for sampling and measuring effluent air emissions, ambient air quality, and gaseous radioactive air emissions. Real-time monitoring instruments with the capability to detect parameters at environmental levels were of primary interest during the evaluation. For the purposes of this assessment, environmental levels are defined as concentrations from natural background up to the derived concentration guides (DCG) for members of the public as provided in DOE Order 5400.5, Radiation Protection of the Public and the Environment.

The review of new technologies mainly focused on technologies with proven reliability, commercial availability, and cost efficiency. A priority was placed on improvements to existing technologies and upgrades to instruments currently supporting the RFP environmental monitoring program. Table 6-2 summarizes current monitoring instruments and assessments of the current radiological and nonradiological air monitoring programs. Current monitoring instruments appear to be adequate air monitoring technologies. Possible improvements are recommended; however, they will require further evaluation.

The following existing environmental monitoring programs were evaluated:

- radiological emissions monitoring;
- nonradiological emissions monitoring;
- radiological ambient monitoring;
- nonradiological ambient monitoring; and
- air pollution prevention and fugitive emissions control-IAG programs.

New technologies in the R&D stages were reviewed but not evaluated. R&D technologies will be evaluated during ongoing efforts by EG&G and DOE.

6.6.1 Monitoring Technologies Assessment Approach

New technologies were reviewed and evaluated to identify and evaluate those instruments that monitor and detect potential releases of constituents in ambient air and effluent air emissions at RFP. The assessment approach considered D&D monitoring activities and requirements. The two primary monitoring requirements addressed were real-time monitoring and environmental levels of sensitivity. These capabilities were specifically researched for each monitoring parameter. The purpose of the assessment was to provide a limited evaluation of information related to monitoring technologies. The review and evaluation of new technologies were approached in the following manner:

TABLE 6-2
Industrial Area IM/IRA/DD
Air Monitoring Technologies
Radiological and Nonradiological Emission Monitoring

Current Monitoring Instruments	Assessment	Rationale
SAAM	Adequate, improved SAAMs	Improved sensitivity and reliability
Particulate Filter Screening	Adequate	No performance improvements identified
Particulate Filter Counting by Alpha Spectroscopy (lab)	Improved alpha spectrometers	Improved sensitivity and reliability
Radiological Analysis (lab)	Adequate	Best available technologies
Tritium Gas Monitoring by Scintillation Spectrometry	Adequate, upgrades available in instruments and procedures	Greater sensitivity and reliability Biodegradable liquid scintillation solutions available resulting in waste minimization
Air Emission Sample Filters for Beryllium Analysis	Adequate	Best available technology

Notes: SAAM = Selective Alpha Air Monitor

- Gain an understanding of the current monitoring programs and identify basic monitoring goals, including the development of technologies assessment criteria.
- Determine the specific monitoring instruments and technologies currently used by the environmental programs at RFP.
- Obtain environmental technologies information from personnel at RFP and other DOE facilities that are involved with the environmental monitoring programs.
- Contact the manufacturers of the current instrumentation and determine available upgrades to existing RFP instruments and the benefits achieved from these upgrades.
- Contact other manufacturers of similar instrumentation to evaluate technologies and compare with current RFP instrumentation performance.
- Determine R&D technologies available and information contacts.
- Evaluate information obtained from this assessment and develop recommendations.

This assessment identified literature concerning current and possible future systems, databases, technology information transfer programs, and the strengths and limitations of current and new technologies.

New technologies in the R&D stages were also reviewed. R&D technologies for real-time monitoring at environmental levels of nonradiological parameters in air do exist; however, they are laboratory-based. These technologies will require further evaluation to determine their applicability, cost effectiveness, and reliability.

Existing DOE facilities that have radiological and nonradiological environmental monitoring requirements similar to RFP programs (Fernald, Ohio and Weldon Spring, Missouri) were contacted to ascertain technologies and instruments used for monitoring at other DOE facilities. Generally, these facilities were using similar technologies and instruments for their monitoring activities.

Several DOE sources of R&D technologies were identified including (1) Environmental Technologies Group at RFP; (2) LANL, Technologies Group; and (3) EG&G Nevada Field Office, Office of Technology Development. Other private-sector R&D innovative technologies sources may be available from engineering departments of major instrument manufacturers and research institutions.

The majority of the manufacturers and/or vendors of environmental air monitoring instruments currently used at RFP were contacted to determine the most recent upgrades and improvements to the existing monitoring instrumentation.

Meteorological and ComRad air monitoring programs were not evaluated during this assessment because they will not be part of the proposed verification monitoring program. Radioiodine air monitoring was not reviewed because the program was discontinued. In addition, worker safety air sampling (industrial hygiene) programs are not applicable to the objective of this decision document and are not discussed in this technologies assessment.

6.6.2 Radiological Emissions

As discussed earlier, radiological emissions are currently evaluated by a three-tiered program: (1) SAAMs, (2) particulate emissions monitoring of air duct particulate filters for TLLA and TLLB, and (3) radiological alpha spectrometric analysis of isotopes collected on air duct particulate filters. Radiological emissions monitoring also includes tritium gas monitoring. The three-tiered monitoring sequence has varying degrees of sensitivity and response times for each monitoring instrument.

6.6.2.1 Selective Alpha Air Monitors

SAAMs are currently used for real-time alpha activity monitoring at occupational exposure levels. No instrumentation is available for real-time monitoring of alpha activity at environmental levels because of the low sensitivity required and interferences by short-lived alpha activity.

The RFP *Environmental Monitoring Plan* (EG&G 1992a) states that RADēCO (also known as Science Applications International Corporation [SAIC] RADēCO) Models 441, 442, or 442 ARF, solid-state radiation detecting instruments are the current SAAMs being used for the continuous direct measurement of alpha activity within building air duct systems.

The SAAM instruments currently used for continuous detection of alpha-emitting radioactive aerosols at RFP are acceptable for current monitoring objectives. However, other SAAM instruments are available and do offer improved performance over current instruments. Instrument improvements are related to the particulate collection efficiency and, therefore, offer greater sensitivity. These improved SAAM instrument designs may be capable of detecting less than eight derived-air-concentration (DAC) hours of plutonium-239 in a background of 1 picocurie per liter (pCi/L). The sensitivity of the new SAAMs is above environmental levels. The new SAAMs that are available were designed to meet the sensitivity recommendation of DOE Order 5480-11, Radiation Protection For Occupational Workers, which is eight DAC hours. However, it should be noted that the final rule (10 CFR Part 835) codifying DOE occupational radiation protection directives does not require the eight DAC-hour sensitivity because of the inability to achieve this goal in all operations. The sensitivity of this method for environmental monitoring of radioactivity is limited because of interferences of the short-lived alpha activity emitted from naturally occurring radionuclides.

The SAIC/RADēCO Model 452 Alpha SAAM may be a possible upgrade. It incorporates the improved design, providing greater sensitivity; and it is plug-compatible with the SAIC/RADēCO earlier Models 441 and 442 series alpha monitors.

6.6.2.2 Particulate Emissions Monitoring

Particulate emissions monitoring consists of two steps: (1) screening air duct emission particulate sample filters for TLLA activity during filter removal and (2) radiometric counting for TLLA and TLLB. Currently, the instrument used for screening is a Ludlum Model 12-1A portable alpha particle survey meter with an air proportional alpha detector (EG&G 1992a). Each used filter is screened for radioactivity before being removed from the filter holder. If the radioactivity level is below 2,500 counts per minute (cpm), the filter is placed in a sample tube carrier. If the level is greater than 2,500 cpm, the filter is placed in a glassine envelope. Filters are then transported to the laboratory for analysis.

The technology used for preliminary screening of sample filters for TLLA appears to be adequate for current monitoring objectives. No new technologies were identified that provide improved performance. Improvements to current instrumentation were related to upgrades in electronics and not general performance.

The second step of the particulate emission monitoring is a count analysis for TLLA and TLLB air sample filter activity by the analytical laboratory. Alpha radiation is the principal type of radiation associated with radionuclide emissions from RFP and can be measured by TLLA radiation detection. However, naturally occurring short-lived radionuclides, such as radon decay products, also emit alpha radiation and can contribute to the total alpha activity measured. The contribution of decay products can be quantified by taking two counts of the air filter samples within 24 hours after collection to allow for the additional decay of this short-lived activity, and again after 72 hours of decay. TLLA, which results primarily from plutonium, uranium, and americium, is estimated from the results of the counts. This screening method provides a more sensitive analysis of radioactive duct emissions than SAAMs but requires a longer period for the results to be obtained (approximately three days) (EG&G 1992b).

A Nuclear Data (ND) ND6620 pulse height analyzer with a multi-input counter module and 90 solid-state detectors is used to determine TLLA activity on the emissions filters (EG&G 1992a).

The technology used for total filter activity counting by the laboratory, using a pulse height analyzer, is adequate but could be greatly enhanced by new instrumentation. It was determined that greater performance and sensitivity may be possible with updated and improved pulse height analyzers. Improvements in the signal processing technology (both hardware and software) have improved modern instrument performance over the instrumentation currently used.

6.6.2.3 Specific Radioisotope Analysis

Specific radioisotope analysis is performed on the air duct emission particulate sample filters mentioned previously to identify plutonium-238, plutonium-239/240, uranium-233/234, uranium-238, and americium-241 by using alpha spectrometry (EG&G 1992a). Samples are collected for one month, and a composite of each source location is taken using radiological procedures. Because the amount of radioactive material collected on the biweekly sample filter is normally below the detection limits of the radiochemical method, a monthly composite sample is used for analysis. The analysis is performed by the laboratory and is typically completed four to six weeks after collection and compositing of filters. The analysis requires a complex and time-consuming analytical process. The radiological analysis that is performed is the most specific and sensitive measurement available for determining the extremely low levels of radioactive isotopes that may be present in the duct emissions under routine operations.

The methods of radiological analysis used by RFP follow regulatory guidelines and are consistent with industry standards. No new methods or technology for radiological analysis were identified.

6.6.2.4 Gas Monitoring

Tritium is the only gaseous radioactive emission material routinely monitored at the RFP. Tritium is monitored through liquid scintillation counting of discrete bubble-impinger samples (EG&G 1992a). Available technologies for the sampling and measurement of environmental levels of tritium in air include both active and passive systems. Active systems consist of an air pump, tritium collector or detector, and a flow-measuring device. Tritium collectors include cold traps, tritium-free water, desiccants or molecular sieves. Active systems using tritium-free water ("bubblers") are used extensively with good collection efficiency and sensitivity. Passive systems rely on natural diffusion with the sampling rate being determined by the opening in the sampler and knowledge of the absolute humidity during the sampling period. Both active and passive systems using collectors receive tritium as tritiated water, which is generally analyzed after sampling with a liquid scintillation counter. Active systems using direct measurement include ionization chambers, proportional counters, and solid scintillators. The detection limits of active and passive systems using collectors are similar; however, passive samplers generally require longer sampling periods to sample the same volume of air as the active systems. Active systems using direct measurement can provide near real-time measurements but are generally one to two orders of magnitude less sensitive than the systems with collectors, and performance can be degraded by humidity. For systems with collection of tritiated water, the sensitivity of detection can be significantly improved by the use of liquid scintillation counters designed for very low-level counting.

Currently, scintillation counting persists as the most widely used industry technique for the analysis of tritium in water. However, improvements in the signal processing technology (both hardware and software) have improved the performance of modern scintillation spectrometers. Moreover, new biodegradable liquid scintillation solutions (cocktails) are rapidly replacing the more toxic scintillation solutions. These new solutions have helped greatly reduce the waste problems associated with scintillation counting. Real-time air monitoring technologies for tritium currently do not have the necessary sensitivity to monitor emissions at environmental levels.

6.6.3 Nonradiological Emissions Monitoring

Beryllium is the only nonradiological particulate material monitored in effluent air emissions from a stationary source at RFP (EG&G 1992a). Samples are collected from the same filters used for radiological analysis, as described previously. The method of analysis by Graphite Furnace Atomic Absorption of beryllium samples is considered the best available analysis technique.

6.6.4 Radiological Ambient Monitoring

The radioactive ambient monitoring program includes two programs: (1) the RAAMP program, and (2) the OU-specific monitoring program. Filters from the RAAMP samplers are analyzed for plutonium-239/240. Sample filters from the OU monitors are analyzed for uranium-234, uranium-238, plutonium-239/240, and americium-241. The instrumentation used to collect the air samples for both programs are similar. Currently, real-time air monitoring instrumentation is not available for monitoring ambient concentrations of the above radionuclides at environmental levels.

6.6.4.1 Radiological Ambient Air Monitoring Program

The instrumentation used for the RAAMP program by RFP currently includes two types of high-volume samplers: existing RAAMP samplers and the newly designed Rocky Flats impactor samplers (EG&G 1992a). CDH also monitors for airborne ambient radioactive particles at RFP. The CDH high volume air samplers are made by General Metal Works. One of the CDH samplers is equipped with a cascade impactor system.

Construction of the Rocky Flats impactor samplers began during the first quarter of 1994. EG&G has scheduled all the existing RAAMP samplers to be replaced with the improved design by 1995. The new samplers are designed by EG&G and satisfy agency and DOE requirements. The design of the new air samplers also takes into account various external oversight recommendations generated by evaluations of the RFP air monitoring program (EG&G 1993a) and has been tested in the EPA Research Triangle Park (North Carolina) wind tunnel. Final results of the testing are not available.

The new sampler design provides the ability to separate radioactive particles into two size ranges and retain them for analysis. These new samplers are adequate for the monitoring of ambient air conditions using current technologies. Other air monitoring sampling equipment is available; however, basic technologies are similar and no advantages were identified.

Sample filters from both types of RAAMP samplers are collected biweekly and composited monthly, by location, before being submitted to a laboratory for isotopic analysis. The analytical methods and the frequency of sample collection and compositing used for isotopic analysis of high-volume air filter samples appear technically sound and adequate.

6.6.4.2 Operable Unit-Specific Air Quality Monitoring

The purpose of the current OU air quality monitoring program is to address requirements for environmental ambient air sampling in conjunction with remediation of contaminated sites at RFP. The technologies and instrumentation used for OU air quality monitoring are discussed in the following paragraphs.

Air samplers that use laboratory analysis for ambient air OU monitoring include temporary high-volume air samplers, existing RAAMP samplers, and ultrahigh volume air samplers.

The special air quality samplers are commercially available units made by Hi-Q Environmental that use internal brushless motors with flow control and flow totaling. These samplers use a mass flow-controlled circuit to maintain a constant flow rate throughout the sampling cycle. Remediation activities also include the use of several RAAMP samplers in the vicinity of the respective OU.

Ultrahigh volume air samplers will be used at OU3 for time efficiency to collect a sufficient volume of a particulate sample. Sufficient sample volume is paramount in the detection of low levels of ambient radiological activity in air-suspended particulates. Ultrahigh-volume samplers are capable of collecting a sufficient air sample volume in a shorter amount of sampling time by using ultrahigh flow rates (i.e., 500-600 cfm). This sampling capability allows for decreased sample collection and, therefore, faster data reporting. RFP has supported considerable research on suspension and resuspension of radioactive particles; ultrahigh volume samplers were developed through this research.

The results of this technologies assessment determined that the air sampling methods and instruments used for OU air quality monitoring are more than adequate. These instruments are reliable and use proven technologies for ambient radiological air monitoring at environmental levels. No real-time instrumentation is available that has the capability to monitor radiation at environmental levels in air. However, the *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) suggests a mass loading correlation with radionuclide levels in air. Most real-time monitoring equipment is limited to worker safety levels of radiological activity.

The laboratory analytical methods selected for the analysis of ambient air monitoring filters for OU air quality monitoring are similar to those described for the RAAMP filters and were found to be adequate for current monitoring. OU ambient air monitoring filters are collected biweekly and composited monthly by location. The parameters analysis depends on the specific OU being monitored.

Real-time instrumentation supporting OU monitoring includes piezobalances, Miniature Real-Time Aerosol Monitor (MINIRAM), laser particle counters, HNu, and organic vapor analyzer (OVA) (DOE 1991a). The piezobalances, MINIRAM, and laser particle counters are real-time instruments used to monitor fugitive dust emissions. They are capable of detecting TSP at occupational action levels and verifying the effectiveness of dust suppression techniques. The OVA and HNu are real-time instruments for the detection of VOCs and are generally used for occupational health and safety applications. These methodologies are designed for worker protection and as event indicators for remedial activities.

6.6.5 Nonradiological Ambient Air Quality Monitoring

TSP and PM-10 are currently monitored at one nonradiological particulate air sampling station at RFP. The siting, sampling, and analysis methods used for TSP and PM-10 monitoring follow current EPA-recommended guidelines and are considered to follow industry standards. CDH's Air Pollution Control Division also monitors for TSP, PM-10, and beryllium at three sites along the outside boundary of RFP, with two additional sites planned.

Ambient monitoring for VOCs and metals is proposed in Section 6.7 for establishment of an ambient air quality baseline concentration at RFP. Ambient air quality baseline information will be collected before remediation or nonroutine activities begin. The current nonradiological ambient air monitoring program and assessments of potential improvements are summarized in Table 6-3.

6.6.5.1 Total Suspended Particulates

The TSP samplers currently used at RFP are Hi-Q Environmental models equipped with an electronic seven-day timer, elapsed timer, and electronic mass-flow controller for maintaining stable flow rates. Operational flow rates are maintained within reference guidelines (Title 40 CFR, Part 50, Appendix B). Flow readings are taken with an 8-inch rigid manometer. The TSP sampler currently used by RFP incorporates the best available technology for monitoring for TSP.

6.6.5.2 Particulates Less Than 10 Microns in Diameter

The PM-10 sampler currently used at RFP is a Wedding and Associates Model 10 Micron Inlet, equipped with a size-selective inlet and volumetric flow control system, mechanical seven-day timer, and 24-hour elapsed timer. Airflow readings are taken using a 20-inch rigid manometer (or equivalent electronic transfer standard). The unique design of the Wedding critical flow device allows for the use of an inexpensive motor/blower. The sampler flow remains more constant than a sampler using an electronic mass-flow type controller. The Wedding PM-10 sampler is a proven and acceptable design to measure PM-10. Other samplers are available using similar basic designs; however, no performance advantages were identified.

TABLE 6-3
Industrial Area IM/IRA/DD
Air Monitoring Technologies
Radiological and Nonradiological Ambient Monitoring

Current Monitoring Instruments	Assessment	Rationale
High-Volume Air Samplers (RAAMP Program)	Upgrade system with improved EG&G samplers and integration of air sampling program by telemetry	Improved sampling techniques and sampling quality
Temporary High-Volume Samplers (OU-specific)	Replace with improved EG&G samplers (integrate into RAAMP)	Improved sampling techniques and sampling quality
Ultrahigh-Volume Samplers (OU-specific)	Adequate	Decreased sample collection time
Total Suspended Particulates (TSPs) (nonradiological)	Adequate	Industry standard, best available technologies
Particulate Matter less than 10 microns in diameter (PM-10) (nonradiological)	Adequate	Industry standard, best available technologies
Volatile organic compounds (VOCs) (currently not monitored)	Monitoring using Summa canisters plus EPA Method TO-14	APENs and baseline air quality establishment per CERCLA requirements
Metals	High-Volume air samplers or TSP samplers	Establishment of baseline air quality data

Notes:
APENs = Air Pollution Emission Notices
EPA = U.S. Environmental Protection Agency
IM/IRA/DD = Intermim Measures/Interim Remedial Action/Decision Document
OU = Operable Unit
RAAMP = Radioactive Ambient Air Monitoring Program

6.6.5.3 Volatile Organic Compounds

Currently, no VOC emissions are monitored by RFP at environmental levels. However, CDH's Air Quality Control Division does monitor for VOCs at three locations outside and along the RFP boundary. Two additional monitoring stations for VOCs are currently planned. CDH's air monitoring program uses EPA Method TO-1 to monitor for VOCs, which includes Tenex resin as an absorbent for subsequent laboratory analysis.

Basically, two collection methods (Summa™ canisters and Tenex tubes) are commercially available for the detection of VOCs in air at low environmental levels. However, these methods are supported by laboratory analysis and are not capable of real-time continuous monitoring. Real-time continuous monitoring of VOCs in air at remote locations is available using portable gas chromatograph instrumentation. However, portable gas chromatograph instruments were assessed and determined to require high maintenance and to be unreliable. Other methods of real-time VOC air monitoring do exist but do not measure continuously and have high levels of sensitivity.

Ambient VOC monitoring is proposed (1) before D&D to establish a baseline air quality profile and (2) during D&D activities to monitor air quality, when VOCs are identified as COPCs associated with a particular activity. The monitoring techniques and instruments proposed for ambient VOC monitoring at RFP are sample collection by Summa™ canister and analysis following EPA Method TO-14.

The Summa™ canister and EPA Method TO-14 monitoring approach is supported by the following:

- RFP air monitoring personnel currently have Summa™ canisters and are familiar with EPA TO-14 analytical methods.

- To improve sample collection quality, a Summa™ canister collects more than an ample amount of sample for laboratory analysis and reanalysis, therefore, decreasing the need for sample re-collection if a sample is lost as a result of a laboratory problem.

- The cost of sample collection by Summa™ canisters is comparable to Tenex, considering that a backup Tenex sample is routinely collected because of sampling quality associated with Tenex samplers.

6.6.5.4 Metals

Metals analysis may be performed on filters collected for particulate concentrations in air by the high-volume air sampler. No real-time instruments are available for metals analysis in air at environmental levels.

6.6.6 Air Pollution Prevention and Fugitive Emissions Control - Interagency Agreement Programs

The monitoring equipment used for the Air Pollution Prevention and Fugitive Emissions Control - IAG Programs is primarily related to occupational safety monitoring during short time periods (less than 10 hours). The equipment is portable and provides direct and indirect real-time measurements of air quality. The instruments are designed to be used as close as possible to the work area (approximately 5 to 10 meters).

The monitoring equipment recommended for use during the Air Pollution Prevention and Fugitive Emissions Control activities for air contaminant measurement include piezobalances, high-volume samplers, laser particle counters, MINIRAM, HNu trace gas analyzer, and photovac microtip handheld air monitor (DOE 1991a). A more detailed discussion of the instruments used for air pollution prevention and fugitive emissions control activities is provided in the *Plan for Prevention of Contaminant Dispersion* (DOE 1991a).

These real-time instruments will provide assurances that airborne constituents do not exceed predetermined concentration levels over short periods. Some monitors are capable of measuring constituent concentrations directly, but most are capable of only indirect measurement of concentrations. None of the instruments directly measure radionuclides.

Real-time measurements made during implementation of the Air Pollution Prevention and Fugitive Emissions Control - IAG Programs will be the primary means of evaluating the effectiveness of mitigative measures (DOE 1991a). Real-time direct and indirect measurements will be made within the work zone during D&D activities. Measuring concentrations of contaminants using the available technologies and instruments at the Industrial Area or RFP boundary is not practical. This impracticality is primarily a result of atmospheric dispersion that significantly reduces airborne concentrations from the point of origin. Consequently, to evaluate the effectiveness of the mitigative measures air will be monitored near the D&D activities. This evaluation requires establishing an action level concentration that can be measured near the emission source (i.e., D&D activities) and that can be correlated to an acceptable concentration at the Industrial Area perimeter or RFP boundary. The correlation is based on ambient high-volume air sampling analysis data. Action levels established for air pollutions and fugitive emissions monitoring are provided in the *Plan for Prevention of Contaminant Dispersion* (DOE 1991a).

6.7 PROPOSED ACTIONS FOR MONITORING PROGRAMS

Proposed actions for addressing additional data needs identified during evaluation of the RFP air quality monitoring program are described in the following paragraphs. The actions are consistent with the following programs: radioactive and nonradioactive emissions monitoring, radioactive and nonradioactive ambient air monitoring, meteorology, and contaminant dispersion prevention.

6.7.1 Radioactive Emissions Monitoring

Because the mission of RFP will require that some activities be performed within the former process facilities, no changes to the current effluent emission monitoring program are proposed. The current program is more than adequate to characterize concentrations in Industrial Area building effluent emissions.

6.7.2 Nonradioactive Emissions Monitoring

Beryllium sample collection frequency should be decreased until D&D begins in process and storage areas, as proposed in the *Rocky Flats Plant Air Quality Management Plan* (EG&G 1992b). Additional beryllium sampling reductions are anticipated.

6.7.3 Radioactive Ambient Air Monitoring

The DOE-proposed plan for new samplers and new sampler locations documented in the *Assessment and Integration of Radioactive Ambient Air Monitoring at Rocky Flats Plant* (EG&G 1993a) will be implemented before significant progress is made on RFP remedial activities or mission transition and D&D. The proposed network appears adequate and improves the existing network. The new locations and samplers will provide data in areas generally downwind of the Industrial Area that were not previously sampled. Baseline data for the new equipment and locations can be collected, and necessary revisions to the program can be made before D&D activities begin. This assessment document incorporates a "systems-approach" to site-wide ambient air monitoring and was reviewed and evaluated by DOE, CDH, EPA, and various technical oversight groups.

6.7.4 Nonradioactive Ambient Air Monitoring

Baseline concentrations of site-specific metals and VOCs will be compiled for the Industrial Area. Additional samplers are not required to determine metals concentrations in air. Metals analysis will be performed on filters collected for nonradiological particulate analysis. Installation of permanent samplers is not required. Existing sampler locations are generally based on air dispersion modeling or best technical judgment and are currently included in the RFP computer mapping system. If new locations must be established, use of the TRAC model or other acceptable dispersion models, combined with the technical knowledge of RFP air quality personnel, will be sufficient for determining sampler locations. Summa™ canisters will be placed at RAAMP locations S-16, S-05, S-07, and S-23.

DOE Order 5400.1 recommends that data be collected for one year to establish baseline levels, unless a demonstrated technically equivalent alternate has been formally established. Because limited operations are currently conducted at RFP and because the period of time before D&D begins may be brief, justification for a short duration of baseline monitoring exists. Some factors that will determine the length of time required to develop a baseline data set include the following:

- Representative conditions - Were conditions during monitoring (weather, site activities) representative of site conditions?

- Detection - If COPCs were not detected, locations may need to be revised, sampling frequency decreased, or specific sampling or analyses considered complete.

- Data availability - Turnaround time for results from laboratory analysis may control the duration of data collection to establish the desired data set.

- Engineering controls - If engineering controls are used during D&D that prevent release to a specific pathway, a baseline for COPCs in that specific environmental media may not be warranted.

- Sources - Potential sources of COPCs will continually be removed as transition of facilities progresses. If all known sources of a COPC have been removed, continued monitoring may not be warranted.

The COPC list for air may be refined by reviewing analytical results from the surface water, groundwater, and soil monitoring programs.

The justifications for collecting baseline metals and VOC concentrations within the Industrial Area perimeter include the following:

- The new Colorado CAA requirements for air toxics will regulate and control many of the constituents not previously controlled. These will include many of the previously discussed constituents.

- Risk assessments will be performed to define levels of cleanup. These risk assessments will require air monitoring to determine baseline concentrations of constituents present in the air at RFP and to be used for confirmation of modeled results.

The change in mission at RFP has led to a decrease in VOC use and emissions from plant facilities. CDH sampler results appear to support this decrease and suggest that the analyte list for the site perimeter can be evaluated and reduced. Changes to the analyte list for D&D verification monitoring will be based on past VOC sampler results, as well as current and planned VOC use or handling.

Although the data from the three CDH Tenex samplers do not indicate the continued release of VOCs, these samplers are not located near potential Industrial Area sources. Measurement of ambient concentrations of VOCs in the Industrial Area is proposed to characterize the facility with baseline data before nonroutine activities are conducted. By locating VOC samplers within and around the Industrial Area perimeter, baseline concentrations can be measured. VOC samplers will be co-located with existing RAAMP sites at the following locations: S-16, S-05, S-07, and S-23. These locations are shown in Figure 6-2. VOC samplers will also be used to monitor for potential releases resulting from D&D activities.

6.7.5 Meteorological Monitoring

Existing and proposed meteorological monitoring is more than adequate to meet the needs of RFP. No additional recommendations are necessary for this program.

6.7.6 Contaminant Dispersion Prevention

When appropriate, the procedures outlined in the *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) will be followed for remedial and D&D activities performed at RFP. In addition, the *Plan for Prevention of Contaminant Dispersion* (DOE 1991a) will be revised as necessary during these activities.

6.7.7 Conclusions

Based on the evaluation of the existing air monitoring programs and the new technologies, the existing air monitoring programs are generally sufficient to address the majority of the verification monitoring objectives. The following list summarizes the proposed air monitoring actions:

6.8 REFERENCES

Colorado Department of Health. 1993a (October 26). Minutes of Exchange of Information Meeting, Rocky Flats Plant Environmental Surveillance.

Colorado Department of Health. 1993b (May). *Project Task 6, Exposure Pathway Identification and Transport Modeling, Draft Report.* Prepared by ChemRisk.

Colorado Department of Health. 1993c (October). *Project Task 8, Dose Assessment for Historical Contaminant Releases from Rocky Flats, Volumes 1 and 2.* Prepared by ChemRisk.

EG&G Rocky Flats, Inc. 1994a (issued monthly). *Monthly Environmental Monitoring Report.* Rocky Flats Plant, Environmental Protection Management Department, Environmental Protection and Waste Reporting.

EG&G Rocky Flats, Inc. 1994b. *Rocky Flats Plant Site-Wide Quality Assurance Project Plan for CERCLA Remedial Investigation/Feasibility Studies and RCRA Facility Investigation/Corrective Measure Studies Activities.* Environmental Management Division.

EG&G Rocky Flats, Inc. 1994c (February 18). *Air Quality Division Management Plan.*

EG&G Rocky Flats, Inc. 1993a (September). *Assessment and Integration of Radioactive Ambient Air Monitoring at Rocky Flats Plant.*

EG&G Rocky Flats, Inc. 1993b. *Rocky Flats Plant Radionuclide Air Effluent Emissions Monitoring Program Plan.* Draft. RCN-040-93.

- Decrease the beryllium monitoring frequency until D&D activities begin. Existing data will be used to develop baseline concentrations.

- Continue plans for updating and improving the RAAMP before D&D activities begin. Collect baseline data from new samplers/locations.

- Calculate baseline for historical concentrations of COPCs monitored by existing samplers/locations.

- Collect a baseline data set for metals from existing samplers before D&D activities begin.

- Install Summa™ canisters at existing RAAMP locations S-05, S-07, S-16, and S-23, and collect a baseline data set for VOCs before D&D activities begin.

- Evaluate results from existing air monitoring programs and Summa™ canisters during D&D activities to determine whether results are above warning limits described in Section 9.4.

The preprogrammed response for the air monitoring program is described in Section 9.0. The implementation plan for the air verification monitoring program is described in Section 11.3.

EG&G Rocky Flats, Inc. 1993c. *Rocky Flats Plant Site Environmental Report, January through December 1992.*

EG&G Rocky Flats, Inc. 1993d (January). *Rocky Flats Plant Surface-Water and Sediment Monitoring Program Summary.*

EG&G Rocky Flats, Inc. 1993e. (June 30). *Rocky Flats Plant Emergency Plan.* 1-64000-EP-01.00.

EG&G Rocky Flats, Inc. 1993f. *Environmental Protection Management Plan.*

EG&G Rocky Flats, Inc. 1992a. *Environmental Monitoring Plan.* Final.

EG&G Rocky Flats, Inc. 1992b (November). *Rocky Flats Plant Air Quality Management Plan.*

EG&G Rocky Flats, Inc. 1992c. *Environmental Management Division Operating Procedures - Volume VI; Air.*

EG&G Rocky Flats, Inc. 1992d (January 23). *Environmental Management Department Quality Assurance Plan Description.* Golden, Colorado.

EG&G Rocky Flats, Inc. 1989. Draft summary of March 15, 1989 meeting, concerning Rocky Flats Plant air effluent monitoring.

EG&G Rocky Flats, Inc. Latest version, a. *Environmental Management Administrative Procedures.* Manual No. 2-11000-ER-ADM.

EG&G Rocky Flats, Inc. Latest version, b. *Environmental Management Department Operating Procedures*. Volumes I, II, III, IV, and VI. Manual Nos. 5-21000-OPS-FO, 5-21000-OPS-GT, 5-21000-OPS-GW, 5-21000-OPS-SW, and 5-21000-OPS-AP.

U.S. Department of Energy. 1992 (December). *Phase I RFI/RI Work Plan, Rocky Flats Plant, 700 Area, Operable Unit No. 8*. Final.

U.S. Department of Energy. 1991a (November). *Plan for Prevention of Contaminant Dispersion*. Rocky Flats Plant. Golden, Colorado.

U.S. Department of Energy. 1991b (January 22). *Rocky Flats Interagency Agreement*.

U.S. Environmental Protection Agency. 1983 (January). *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II, Ambient Air Specific Methods*. EPA-600/4-77-027a.

U.S. Environmental Protection Agency. 1975 (September). *Guidelines for Air Quality Monitoring Network Design and Instrument Siting*. Office of Air Quality Planning and Standards (OAQPS) No. 1.2-012.

Section 7.0

7.1 FOUNDATIONS, FOUNDATION DRAINS, BUILDING SUMPS, VALVE VAULTS, AND SIMILAR SOURCES OF INTERCEPTED GROUNDWATER

The following subsections discuss waters that originate in building sumps, foundation drains, vaults, and basements. Each building in the Industrial Area was evaluated to determine which buildings had foundation drains or sumps. Based on available as-built drawings, Figure 7-1 presents general locations of building drains, sumps, vaults, and some pits. It is not known whether components are still in place and active. Field checks of the as-built drawings are currently being conducted as part of *Technical Memorandum Number 1, Data Compilation, Operable Unit 8* (EG&G 1994).

Interaction with Groundwater. A typical foundation drain is presented in Figure 7-2. During periods of high groundwater, the groundwater table often intersects building foundations. Foundation drains may potentially transport groundwater containing unwanted constituents. Therefore, the drains may be considered a potential contaminant migration pathway.

Interaction with Surface Water. Many of the foundation drains in the Rocky Flats Industrial Area currently discharge directly into the environment. These outfalls usually occur on hillsides that discharge water to a drainage area that becomes part of the surface water. This interaction may be of concern if the foundation drain water is potentially contaminated. The flowpaths for specific foundation drains are identified in Section 5.4 of this report.

Principles of the Foundation Drain. Foundations, foundation drains, sumps, valve vaults, and other structures below ground surface may at times become immersed below the groundwater table. The Rocky Flats area receives a yearly average of 15.2 inches of

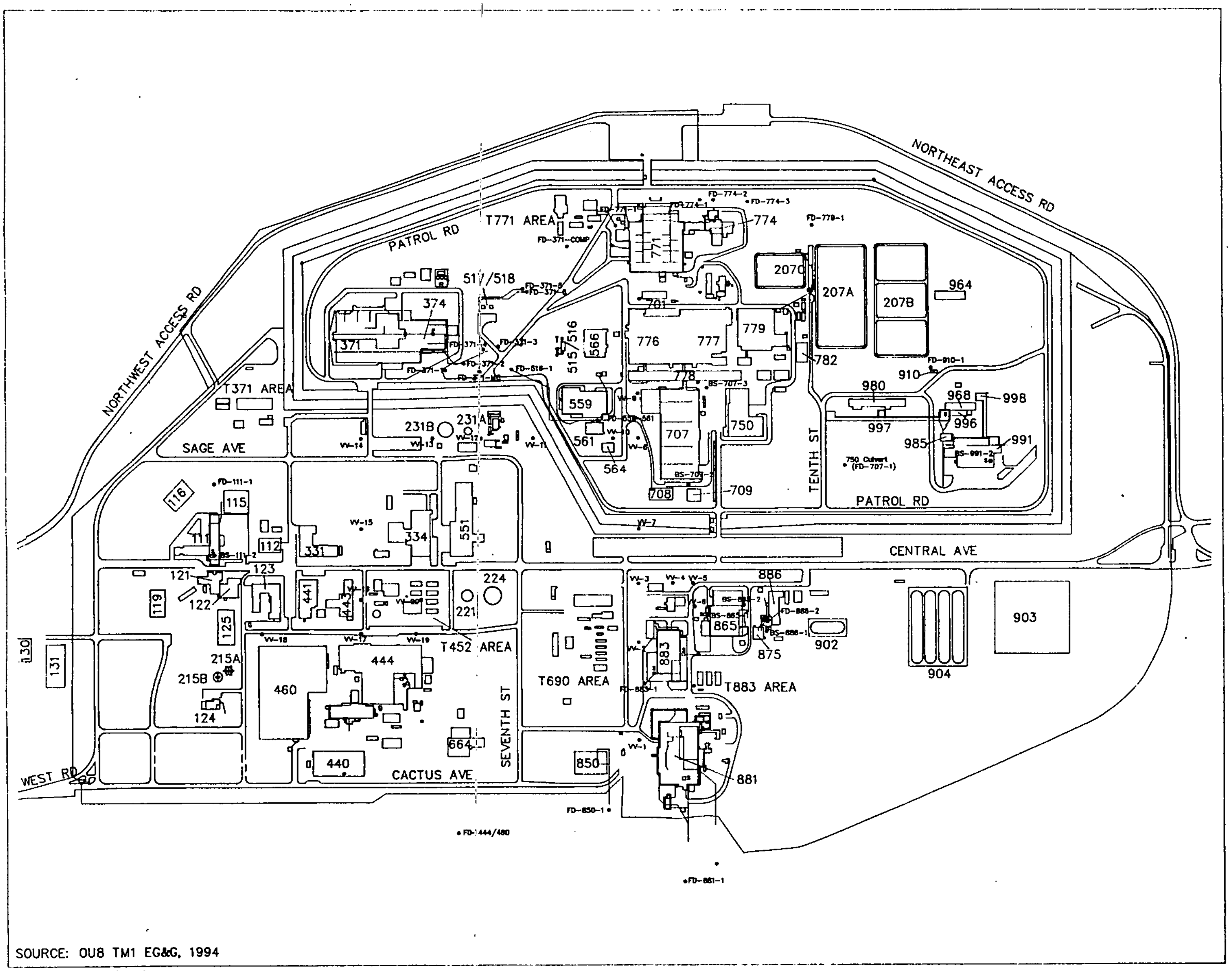
7.0 INCIDENTAL AND FOUNDATION DRAIN WATERS

Incidental waters are defined by the EG&G Rocky Flats Surface Water Division as any waters that accumulate in one or more of the following areas: excavation sites, pits, trenches or ditches, secondary containments or berms, process waste valve vaults, electrical vaults, steam pits and other utility pits, and/or telephone manholes. Incidental waters also include fire suppression system discharges and the natural collection of precipitation and stormwater runoff in excavations, pits, trenches, ditches, and depressions (EG&G 1993a). In general, the primary source of incidental water is considered to be stormwater, but it can also originate as groundwater.

Foundation and footing drains are designed to intercept groundwater and route it away from building substructures. Foundation drain waters generally originate as groundwater, although some of the foundation drains could contain stormwater flow. Stormwater entering foundation and footing drains could originate from direct piping of roof drains into the foundation drains and from stormwater seepage through the backfill into the foundation drains.

Incidental/foundation waters may potentially become contaminated from contact with hazardous materials in buildings, IHSSs, other historical release areas, or contamination from under the buildings. It may be necessary to collect, characterize, and treat these waters before they enter the environment. The objectives of this section are to discuss current incidental/foundation water management and treatment options, and propose actions to be considered for future activities. The information presented in Section 7.0 is based on a review of documentation evaluated as of June 1994. Specific foundation drains and other sources of incidental waters are described in detail in the *Technical Memorandum Number 1, Data Compilation, Operable Unit 8* (EG&G 1994).

(intentionally blank)



U.S. Department of Energy
Rocky Flats Plant

- • Valve Vault
- • Outfall/Sample Location
- ——— Foundation Drain
- ——— Road
- ——— Fence
- □ Structure/Building
- ▫ Sump/Pit
- FD Foundation Drain
- BS Building Sump

N

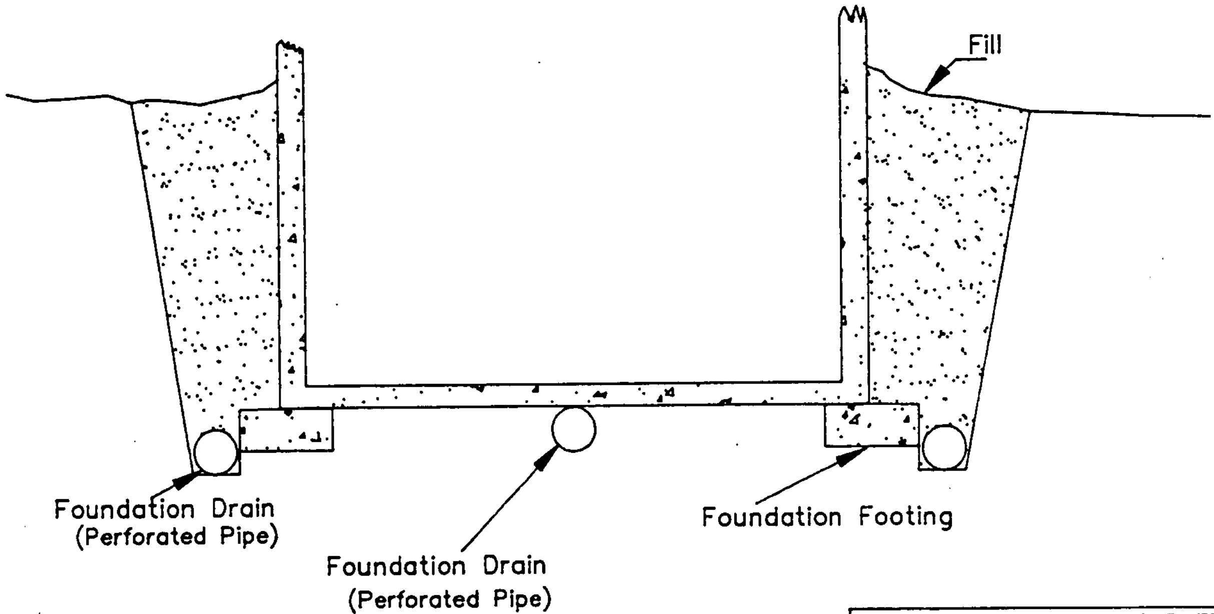
0 100 200 300 400 500 FEET

FIGURE 7-1
INDUSTRIAL AREA IM/IRA/DD

Foundation Drains, Building Sumps, Valve Vaults, and Outfalls

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464



Not To Scale

U.S. DEPARTMENT OF ENERGY
~~EG&G Rocky Flats Plant, Golden, CO~~

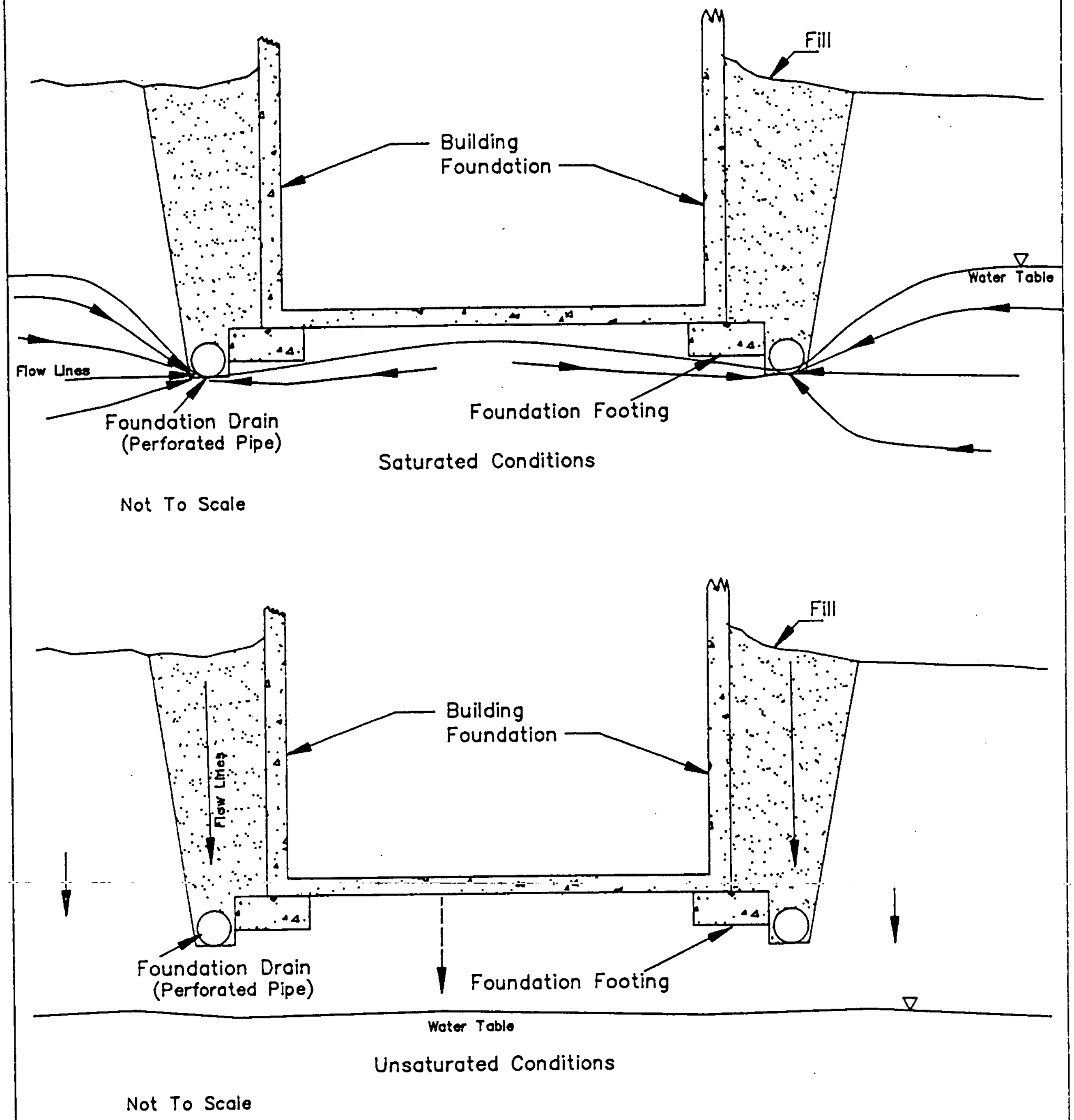
FIGURE 7-2
INDUSTRIAL AREA IM/IRA/DD
Typical Foundation Drain

c:\rflats\tc\6-2-2.dwg 05H60300

precipitation; March, April, and May are the wettest months. Depending on the location within the plant site, the concentrated precipitation during these months occasionally causes the groundwater table to rise 5 to 25 feet and in some areas to within less than 5 feet of the land surface (based on quarterly sampling results in the Industrial Area). Because the foundations of the buildings in the Industrial Area may extend into the saturated zone, the potential for interaction with the groundwater exists. Figure 7-3 schematically illustrates this interaction (EG&G 1994). This interaction is usually somewhat localized in the bedrock, although some effects may be observed in the upper hydrostratigraphic unit. When the water table rises above the level of a dry foundation, the pressure (head) on the outside of the building becomes greater than the pressure on the inside, thus creating a pressure gradient toward the inside of the building. This pressure gradient toward the inside a building creates the potential for water to come in contact with building contaminants. When the head difference reverses as the water table lowers, this water could be returned to the environment. This is of concern because, in this situation, the water may have come in contact with contaminants inside the building.

Additionally, RFP is located geologically on alluvium overlying the Arapahoe Formation (Section 2.2). The Arapahoe Formation is relatively fine grained and generally has a low hydraulic conductivity. New construction often requires the use of fill material around and under foundations. The fill normally possess a higher hydraulic conductivity than the surrounding hydrostratigraphic unit, thus creating a preferential groundwater flow path. The potential exists for waters to accumulate and migrate from precipitation infiltrating down through the higher permeability fill along the sides of the foundation.

The purpose of having foundation drains is to keep the groundwater level below the foundation and thus prevent flooding (e.g., basements, vaults). If the drains are installed and operating properly, the groundwater levels should not rise to the level of the building



U.S. DEPARTMENT OF ENERGY
EG&G Rocky Flats Plant, Golden, CO

FIGURE 7-3

INDUSTRIAL AREA IM/IRA/DD

Interaction Between Foundations and the Water Table

SOURCE: OU8 TM1 EG&G, 1994

C:\RFLATS\OU8\FIG3.DWG 05H60208

foundation. As groundwater levels fluctuate and if the foundation drains are not working properly, the possibility of foundation, sump, basement, and vault flooding exists.

Some of the RFP buildings, including Buildings 774, 776, and 881, have experienced flooding problems as a result of rising groundwater levels (EG&G 1993b). Building 444/447 also experienced flooding; it is believed that this flooding was a result of partial blockage of stormwater pipes in the area that caused a backup of stormwater that eventually flooded the basement. Building foundation drains are discussed in Section 7.2 and presented in Figures A-1 through A-15 in Appendix 7.1. Targeted foundation drains and building sumps in the Industrial Area are summarized in Table 7-1.

7.2 CONTAMINANTS, SOURCES, AND PATHWAYS

The constituents that could potentially be transported by incidental/foundation waters vary among locations within the plant site. Contaminants could include solvents, radiological constituents, metals, and other contaminants associated with current and past RFP operations. This variability is also dependent on the foundation structure, housekeeping in the building, possible contamination under the building, hazardous materials contained within the building, and the condition of the building foundation. Sources of contamination can be spills, historical releases, contamination under the building, and buried materials in the area.

Fill material around the foundation drains is a potential conduit for groundwater migration. Therefore, the fill material is a possible contaminant pathway. Foundation drains can also be considered potential pathways for contaminant transport because many foundation drains lead to storm drains or discharge onto the ground surface. One foundation drain currently has approval for discharge to the wastewater treatment plant.

TABLE 7-1
Industrial Area IM/IRA/DD
Summary of Building Foundation Drains and Pathways

BUILDING	OUTFALL LOCATION	SAMPLE LOCATION	SAMPLE NUMBER	STATUS	PIPE MATERIAL	FILL MATERIAL	LOW/HIGH INVERT ELEVATION
111 (Fig. A-1)	N/V	North of NW corner of Building 111 Building sump in southern basement	FD-111-1 BS-111-2	N Y	Tile	UN	6023.1/6025.0
124 (Fig. A-2)	N/V	South of Building 664	FD-444/460	Y	CMP	UN	6027.0/6028.73
371/374 (Figs. A-3 and A-4)	Drainage ditch SE of Building 374	Metal culvert south of Building 374 North of substation road South of T771 area	FD-371-MC FD-371-3 FD-371-COMP	Y Y N	Porous Concrete, PVC	Compacted Sand	5966.1/5985.0
444 (Fig. A-5)	South of Building 664	South of Building 664	FD-444/460	Y	UN	UN	6007.0/6008.25
447 (Fig. A-5)	South of Building 664	South of Building 664	FD-444/460	Y	Tile	UN	6005.0/6018.0
Substation 517/518	N/V	Hillside north of substation road NE of 517/518 NE of 517/518	FD-371-4 FD-371-5 FD-371-6	N N N	PVC, Cast Iron	UN	5970.05/5971.5
559/561 (Fig. A-6)	STP via Building 560	Drainage to the east of 516 Manhole between 559 and 561	FD-516-1 FD-559/561	N Y	hel-cor	UN	5982.3/5985.14
707 (Fig. A-6)	750 Culvert	Vault to the north of Building 709 750 Culvert Outside NE corner of Building 707	BS-707-2 FD-707-1 BS-707-3	Y Y N	UN	Graded filter	5981.0/5982.75
771 (Fig. A-7)	N/V	Grate 50 feet SW of SW corner of 776 guardpost	FD-771-1	Y	Tile, Vitrified clay	UN	5938.0/5948.58
774 (Fig. A-7)	Northern hillside	Pond north of 774	FD-774-1	N	Tile, CMP	UN	5938.1/5952.0

TABLE 7-1
Industrial Area IM/IRA/DD
Summary of Building Foundation Drains and Pathways

BUILDING	OUTFALL LOCATION	SAMPLE LOCATION	SAMPLE NUMBER	STATUS	PIPE MATERIAL	FILL MATERIAL	LOW/HIGH INVERT ELEVATION
779 (Fig. A-8)	North of pond 207A	Storm drain north of pond 207C	FD-779-1	Y	Open tile	UN	5974.2/5978.5
850 (Fig. A-9)	Southern hillside	South of Building 850	FD-850-1	N	UN	UN	UN/5991.79
881 (Fig. A-10)	Southern hillside	Concrete headwall south of Building 881	FD-881-1	Y	Steel, vitrified clay, cast iron	UN	5954.0/5980.5
883 (Fig. A-11)	West of T883 area	Manhole near SW corner	FD-883-1	Y	Steel, PVC	UN	5979.7/5986.3
865 (Fig. A-12)	Manhole on eastern side of Building 865	Manhole on eastern side of Building 865 Sump on western side of Building 865	BS-865-2 BS-865-1	Y Y	Asbestos	UN	5986.0/5988.0
886 (Fig. A-12)	Sump west of Building 875	Sump west of Building 875 Manhole east of Building 828	BS-886-1 FD-886-2	N N	CMP	UN	5975.9/5976.62
910	N/V	NE of Building 910	FD-910-1	Y	UN	UN	UN
996, 997, 999 (Fig. A-13)	N/V	UN	UN	N	Armco pipe	UN	5926.5/5946.0
991, 998 (Fig. A-14)	N/V	UN	UN	N	Armco pipe	UN	5920.0/5932.1
995 (Fig. A-15)	N/V	UN	UN	N	UN	UN	UN

CMP = Corrugated Metal Pipe
N = Not Currently Sampled
NE = Northeast
NW = Northwest
N/V = Not Verified
PVC = Polyvinyl Chloride
SE = Southeast
STP = Sewage Treatment Plant
SW = Southwest
UN = Unknown
Y = Currently Sampled

Source: Information summarized from *Technical Memorandum Number 1, Data Compilation, operable Unit 8, 700 Area (EG&G 1994).*

Specific flowpath data were obtained from the engineering drawings, information from the Surface Water Division, and site walks conducted on November 30, 1993 and December 6, 1993. Figures A-1 through A-15 in Appendix 7.1 show the storm drains, foundation drains, building sumps, and flow paths of buildings having foundation drains in the Industrial Area (EG&G 1994). Elevations of the lowest parts of building foundations, foundation drains, and storm drains, if known, are also shown.

7.3 EXISTING MANAGEMENT, MONITORING, AND DISPOSITION PROGRAMS

The existing programs that relate to the incidental waters and foundation drain waters are outlined in the draft *Surface Water Management Plan* (EG&G 1992a), the Stormwater Program (Section 5.2), and the *Control and Disposition of Incidental Waters* (EG&G 1993a). These programs are currently considered best management practices.

7.3.1 Management Programs

The draft *Surface Water Management Plan* (EG&G 1992a) provides a long-term program for surface water management and disposition at RFP. Surface water is currently managed in different ways, depending on the source. Process wastewater is treated at the Building 374 treatment facility, and nonindustrial wastewater is treated at the wastewater treatment plant, which discharges into the B-series ponds and, ultimately, into Walnut Creek. All treated wastewater and stormwater runoff and some shallow groundwater discharges are stored in the A, B, or C series ponds on the eastern side of the plant before discharging to Big Dry Creek (EG&G 1992a).

Ninety nonstorm water discharge locations have been identified at RFP. Nonstorm water is a term used for waters that do not originate from a precipitation event. Nineteen of the 90 discharge locations that are currently being sampled are foundation drains and building sumps, and the other 71 are utility pits (EG&G 1993c). In addition, approximately 20 valve vaults are located in the Industrial Area, according to engineering drawing number 37810-057 (Process Liquid Waste Collection and Transfer System, RCRA Permitted Unit #40, 1987). The foundation drain waters, for the most part, presently flow into the storm drains or directly into the environment and are not collected for treatment. Exceptions are the water from the Building 559/561 foundation drain, which is pumped to the sanitary sewer system (EG&G 1993d); foundation drain water from Building 886, which is sent to Building 374 to be treated in the process waste system; and the water from Building 881, which is collected and sent to the OU1 treatment facility (EG&G 1993e). A request to discontinue foundation drain discharge from Building 881 to the Interceptor Trench System has been submitted for approval. The Building 881 drain will be rerouted to discharge foundation water to Woman Creek. Sampling of the Building 881 foundation drain water is currently being conducted to verify that it meets discharge standards. Any groundwater that is collected in the process waste valve vaults is also transferred to Building 374 for treatment (EG&G 1993b). Most of the building sumps on the plant site are routed to the process waste treatment facility in Building 374 (Hoffman 1981). Information concerning the destinations of the building sumps at RFP has not been available for review and is considered an additional data need.

Stormwater-related incidental water locations include water collected from berms, pads, manholes, barrels, and various cleanup activities around the Industrial Area. Most of the waters collected were sent to Building 374 to be treated in the process waste evaporators. The volumes of water collected are not known.

7.3.2 Monitoring

Historically, water from foundation drains and building sumps has been monitored. When monitoring data were initially reviewed, it was decided to concentrate only on the most recent. Therefore, the 1992 and 1993 data were specifically reviewed.

In 1992 and 1993, the waters from foundation drains in Buildings 444, 460 (444-460), 774 (774-1), 371 (371-3 and 371-composite), and 779 (779-1), and the water from the building sumps in Buildings 111 (111-2), 707 (707-2), 865 (865-1) and 883 (883-1) were sampled aperiodically, with the sample identification numbers noted in parentheses. Sampling was conducted to ensure that water discharges did not adversely affect surface water quality (EG&G 1993f). The aperiodic sampling included gross alpha, gross beta, tritium, nitrate, pH, conductivity, TDS, and target analyte list (TAL) metals. Volatile and semivolatile compounds were added to the sampling program in July of 1992 (EG&G 1993g). The results from this aperiodic sampling have been evaluated and are presented in the *OU8 Technical Memorandum* (EG&G 1994).

Table 7-2 summarizes analytes that were detected above background levels from aperiodic sampling of foundation drains and building sumps in the Industrial Area in 1992 and 1993 (EG&G 1994). Based on these data, some analytes may occasionally exceed the water quality standards that are currently being proposed at RFP.

These foundation drain sampling locations are identified as nonstorm water discharges. Nonstorm water discharge locations, including these foundation drains, in the RFP Industrial Area as of the spring of 1993 are shown in the April 1993 EG&G report *Non-Storm Water Discharge Locations and Sampling at Rocky Flats* (EG&G 1993c).

Flow rates. The flow rates from these foundation drains and building sumps were not measured, with the exception of limited data from Building 881 Hillside. Flow rate information is estimated because there were flowmeter calibration problems (EG&G 1993h). The following estimated average flow rates were provided by EG&G OU1 personnel:

TABLE 7-2
Industrial Area IM/IRA/DD
Selected Results of Elevated Detections from the Aperiodic Sampling of Building Sumps and Foundation Drains at Rocky Flats Plant

Selected Analytes (1992, 1993)

LOCATION ID	DATE	YEAR	ANALYTE	RESULT (μg/L)
FD-371-3	3/27	1993	Iron Manganese Strontium	3,110 957 1,040
FD-444-460	3/27	1993	Aluminum Iron	1,710 918
FD-559-561	7/25	1992	Mercury 1,1-Dichloroethene Carbon Tetrachloride Chloroform Tetrachloroethene Trichloroethene	0.68 48 220 6 15 160
FD-559-561	3/9	1993	1,1,2,2-Tetrachloroethane 1,1-Dichloroethane 1,1-Dichloroethene 1,2-Dichloroethene Carbon Tetrachloride Chloroform Trichloroethene	23 6 74 17 320 8 160
BS-707-2	3/7	1992	Gross Beta	45 pCi/L
BS-707-2	3/27	1993	Gross Beta	61 pCi/L
FD-771-1	5/1	1993	Aluminum Gross Beta Carbon Tetrachloride Chloroform	619 16 pCi/L 43 45
FD-774-1	3/27	1993	Aluminum Iron Gross Beta	2,580 1,840 15 pCi/L

TABLE 7-2
Industrial Area IM/IRA/DD
Selected Results of Elevated Detections from the Aperiodic Sampling of Building Sumps and Foundation Drains at Rocky Flats Plant

Selected Analytes (1992, 1993)

LOCATION ID	DATE	YEAR	ANALYTE	RESULT (μg/L)
BS-865-2	3/27	1993	Aluminum Manganese Iron Strontium Gross Alpha	564 93.2 835 789 12 pCi/L
BS-883-1	3/7	1992	Aluminum Iron	1,790 1,450
FD-883-1	5/1	1993	Strontium Tetrachloroethene	879 6
FD-886-1	5/1	1993	Gross Alpha	16 pCi/L
FD-886-2	5/1	1993	Gross Alpha	12 pCi/L
FD-910	5/1	1993	Chloroform	20

Notes:

BS	=	Building Sump
FD	=	Foundation Drain
pCi/L	=	picocuries per liter
μg/L	=	micrograms per liter

BUILDING 881 FLOW READINGS (EG&G 1993i)

January, February	~4.0 - 4.25 gallons per minute (gpm)
March, April, May	~7.0 - 15 gpm
June, July, August,	No Information
September, October	~2.3 gpm
November, December	~3.5 gpm

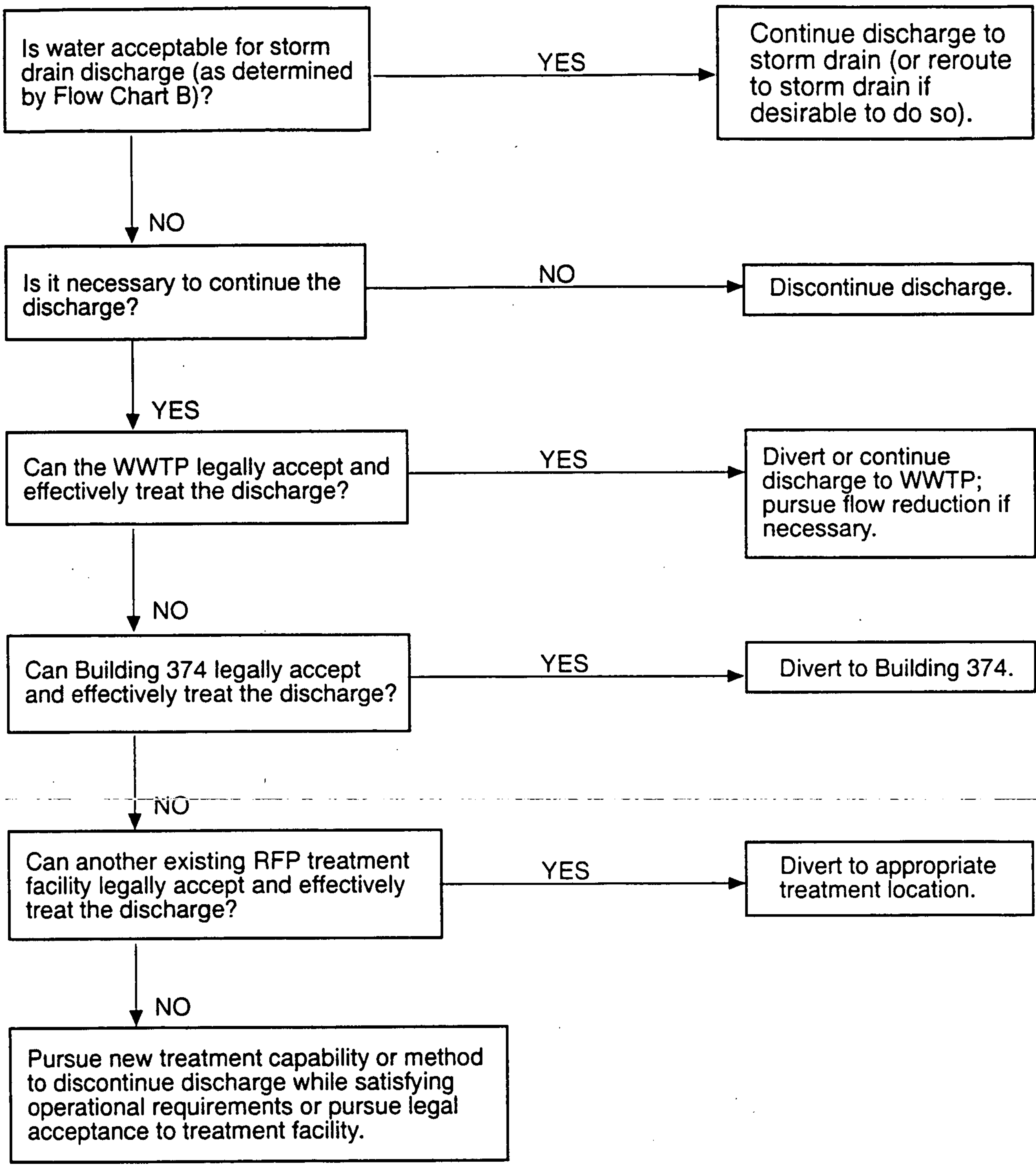
7.3.3 Disposition Program

A written draft procedure concerning the disposition of incidental waters at RFP has been used since May 1990 (EG&G 1993i). The plantwide approved Control and Disposition of Incidental Waters (CDIW) procedure became effective on September 6, 1993 (EG&G 1993a). As defined by the CDIW, this procedure addresses incidental waters that are nonroutine resulting from precipitation events. The procedure also addresses water accumulating in valve vaults. The CDIW procedure gives detailed lists of responsibilities and instructions for each involved party for identifying, sampling, collecting, and containing incidental waters. This document includes examples of the forms that will be filled out and filed with the Surface Water Division. A copy of the CDIW is included in Appendix 7.2.

A draft position paper was prepared on May 13, 1993 by the EG&G Surface Water Division as requested by the Rocky Flats Field Office (RFFO) for the management of foundation drains, utility pits, and other incidental water discharges to the surface waters at RFP. Figures 7-4 and 7-5 are flow diagrams that were proposed as guidance for managing these waters in response to this request. Chart A details the "big picture" of determining discharge routing and Chart B serves as a guide for determining suitability of foundation water discharges to surface water (EG&G 1993j).

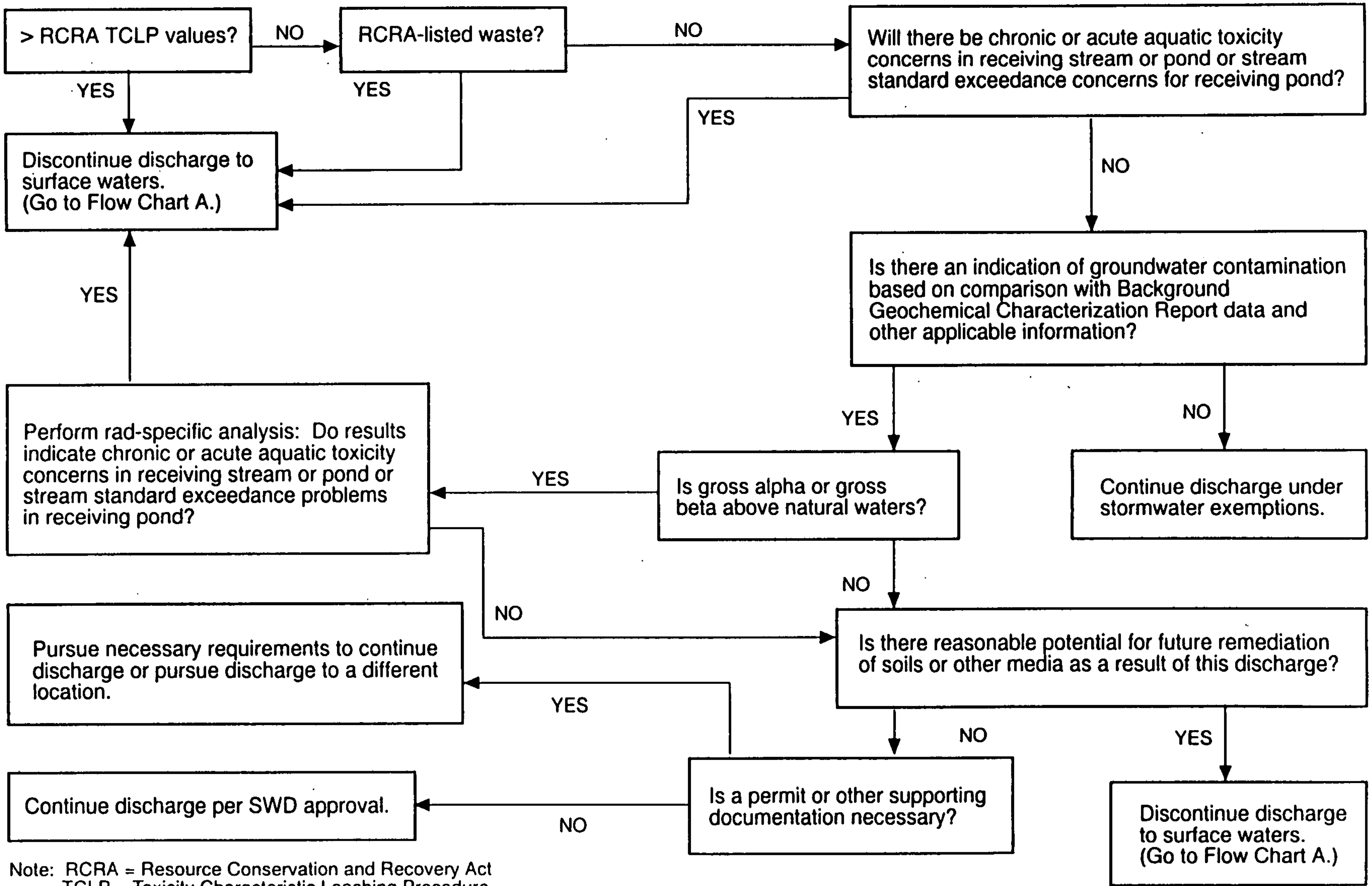
FINAL

FIGURE 7-4
Industrial Area IM/IRA/DD
Flow Chart A: Routing Determination
for Foundation Drain and Utility Pit Discharges



WWTP = Waste Water Treatment Plant
Source: EG&G 1993j

FIGURE 7- 5
Industrial Area IM/IRA/DD
Flow Chart B: Surface Water Discharge Determination for Foundation Drains and Utility Pits



Note: RCRA = Resource Conservation and Recovery Act
TCLP = Toxicity Characteristic Leaching Procedure

Source: EG&G 1993j

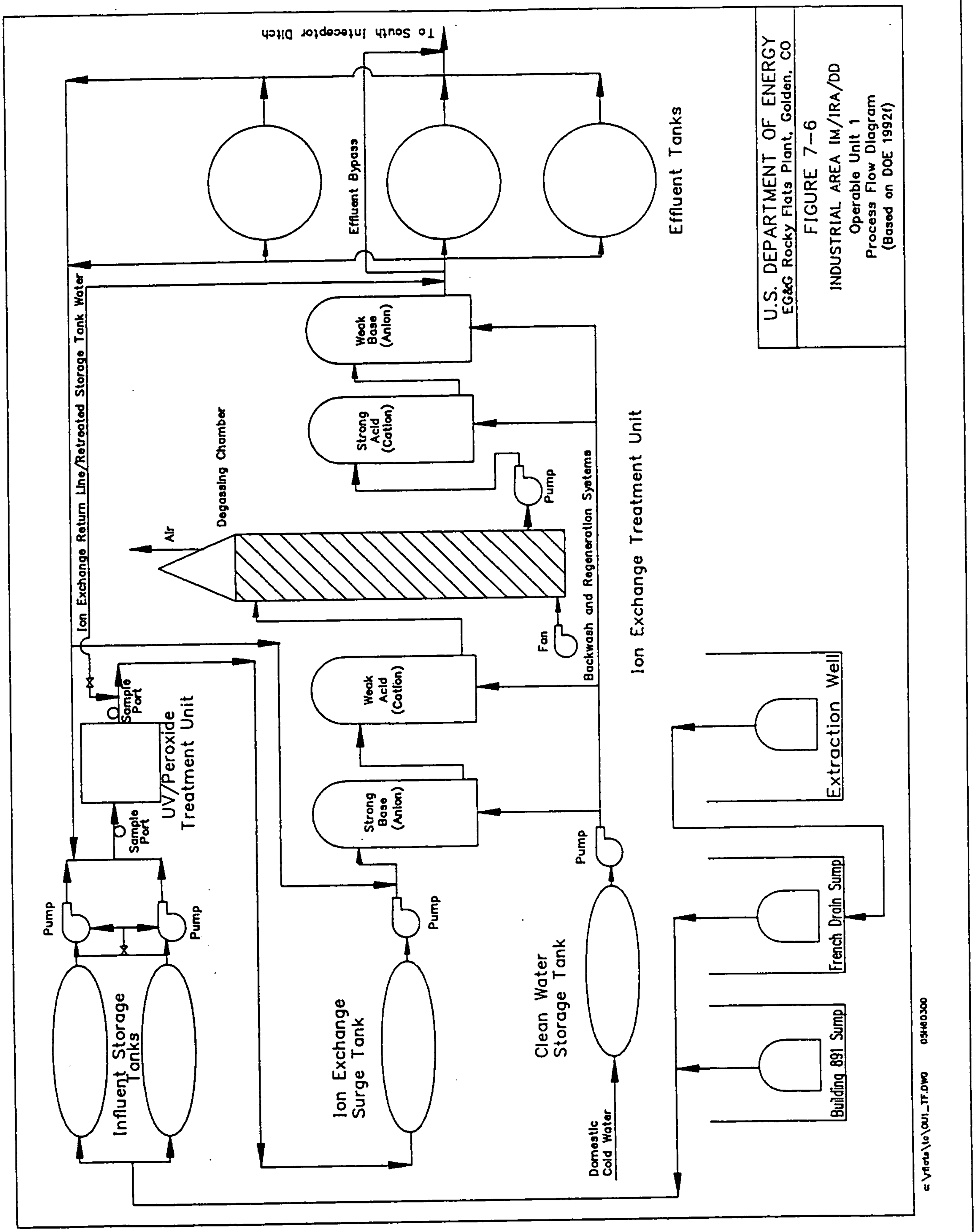
7.4 CURRENT WATER PROCESS CAPABILITIES AND CAPACITIES

Six treatment facilities were reviewed for treating Industrial Area incidental/foundation waters: OU1, OU2, Building 374, WWTP, Building 774, and Building 910. These facilities are described in the following sections. Other water treatment facilities, such as the Domestic Water Treatment Plant and Pond A-4 Treatment Facility, are not discussed in this section. The Pond A-4 facility was excluded because of its distance from the Industrial Area. The Domestic Water Treatment Plant was excluded because treatment of contaminated waters at this facility presents unacceptable risks to the potable water system.

OU1 Building 891 Treatment Facility. The OU1 treatment facility is located to the east of the 800 complex near the contractor's yard. The facility treats groundwater and foundation drain water collected from a french drain/recovery well system located south of Building 881 in OU1 (EG&G 1993i). The facility is designed to treat influents containing volatile organic compounds, semivolatile organic compounds, uranium, heavy metals, and hardness. The facility consists of influent storage, ultraviolet (UV)/hydrogen peroxide treatment, a series of ion exchange columns, a degassing unit and treated effluent storage. A schematic process diagram is presented in Figure 7-6.

Influent water is pumped from the OU1 french drain/recovery well system and is stored in two 15,000-gallon tanks. Water is fed into a UV/hydrogen peroxide treatment unit that has a designed flow rate of 60 gpm. Due to concentrations and types of constituents present, the current typical flow rate is 30 gpm; oxidant dose is 50 mg/l; and input energy is 240 kw. The UV/hydrogen peroxide process is capable of treating a wide range of volatile and semivolatile organic compounds. Water from the UV/hydrogen peroxide process is pumped into another 15,000-gallon storage tank and held until the ion exchange columns are available (EG&G 1993k).

FINAL



U.S. DEPARTMENT OF ENERGY
EG&G Rocky Flats Plant, Golden, CO
FIGURE 7-6
INDUSTRIAL AREA IM/IRA/DD
Operable Unit 1
Process Flow Diagram
(Based on DOE 1992l)
To South Intecepter Ditch
Effluent Bypass
Effluent Tanks
Ion Exchange Return Line/Retreated Storage Tank Water
Weak Base (Anion)
Strong Acid (Cation)
Weak Acid (Cation)
Strong Base (Anion)
Degassing Chamber
Air
Pump
Fan
Backwash and Regeneration Systems
Ion Exchange Treatment Unit
Sample Port
UV/Peroxide Treatment Unit
Influent Storage Tanks
Ion Exchange Surge Tank
Clean Water Storage Tank
Domestic Cold Water
Extraction Well
French Drain Sump
Building 891 Sump
c:\rflats\io\OU1_TF.DWG
05H80300

The ion exchange process consists of four ion exchange columns designed with a flow rate of 30 gpm. The first column removes uranium using contact with strong base anionic exchange resin. The second column is a weak acid cation exchange resin that assists in removing alkalinity and hardness. Water from the first two columns is routed to a degassing chamber to release any gases created by the first two ion exchange processes. After degassing, water enters the third and fourth columns that consist of strong acid cation and weak base anion exchange resins where metals and total dissolved solids are removed. The first ion exchange column is not regenerated and is disposed of when 4,000,000 gallons of water containing the design concentration of uranium have been treated. The latter three ion exchange columns are periodically regenerated at the facility. Ion exchange resins are typically selected for specific applications. The capability of this ion exchange process to treat for radionuclides other than uranium is not known (EG&G 1993k).

The water treated at OU1 is monitored for pH and radionuclides during the treatment processes. Effluent water is stored in three 150,000-gallon effluent tanks until a batch can be sampled. If the effluent is determined to be acceptable, it is released to the south interceptor ditch which flows to Pond C-2. If the effluent does not meet release standards, it is recycled through the treatment system (DOE 1993).

The OU1 treatment facility can treat up to 1,296,000 gallons per month (30 gallons per minute [gpm]) at design capacity of the ion exchange columns, although expansion of the ion exchange process to 60 gpm (to match the UV/hydrogen peroxide process) would double this capacity. Currently, the facility treats up to 300,000 gallons per month during the wet season (March, April, May) and as little as 30,000 gallons per month during the drier months. The facility was treating approximately 100,000 gallons per month during an October 1993 visit (EG&G 1993k). Assuming the standard flow rate of 30 gpm and normal operations at 8 hours per day, the OU1 facility has a minimum available capacity of 432,000 gallons per month. Maximum available capacity (24 hours per day operation) exceeds one million gallons per month.

System limitations of the OU1 facility for treatment of incidental/foundation waters include the inability to treat high concentrations of chlorinated hydrocarbons particularly carbon tetrachloride, the inability to treat free product (NAPL) that could introduce a hazard if admitted into the system, limited removal of plutonium (Pu) and americium (Am) because of the contaminant specific nature of the ion exchange resins, and the inability to remove high concentrations of suspended solids. Other difficulties include transporting incidental waters to the facility (a tanker truck is required), inconsistent sampling results from the effluent storage tanks, and possible algae growth in the effluent tanks resulting in basic waters. In addition, the effluent tanks have been coated with paint that has been leaching organics into the water, resulting in the detection of xylene in some samples (EG&G 1993k).

The proposed acceptance criteria for the OU1 treatment facility are presented in Table 7-3. These acceptance criteria can be used as a guideline. The characterization of all incidental/foundation water must be evaluated on an individual or batch basis.

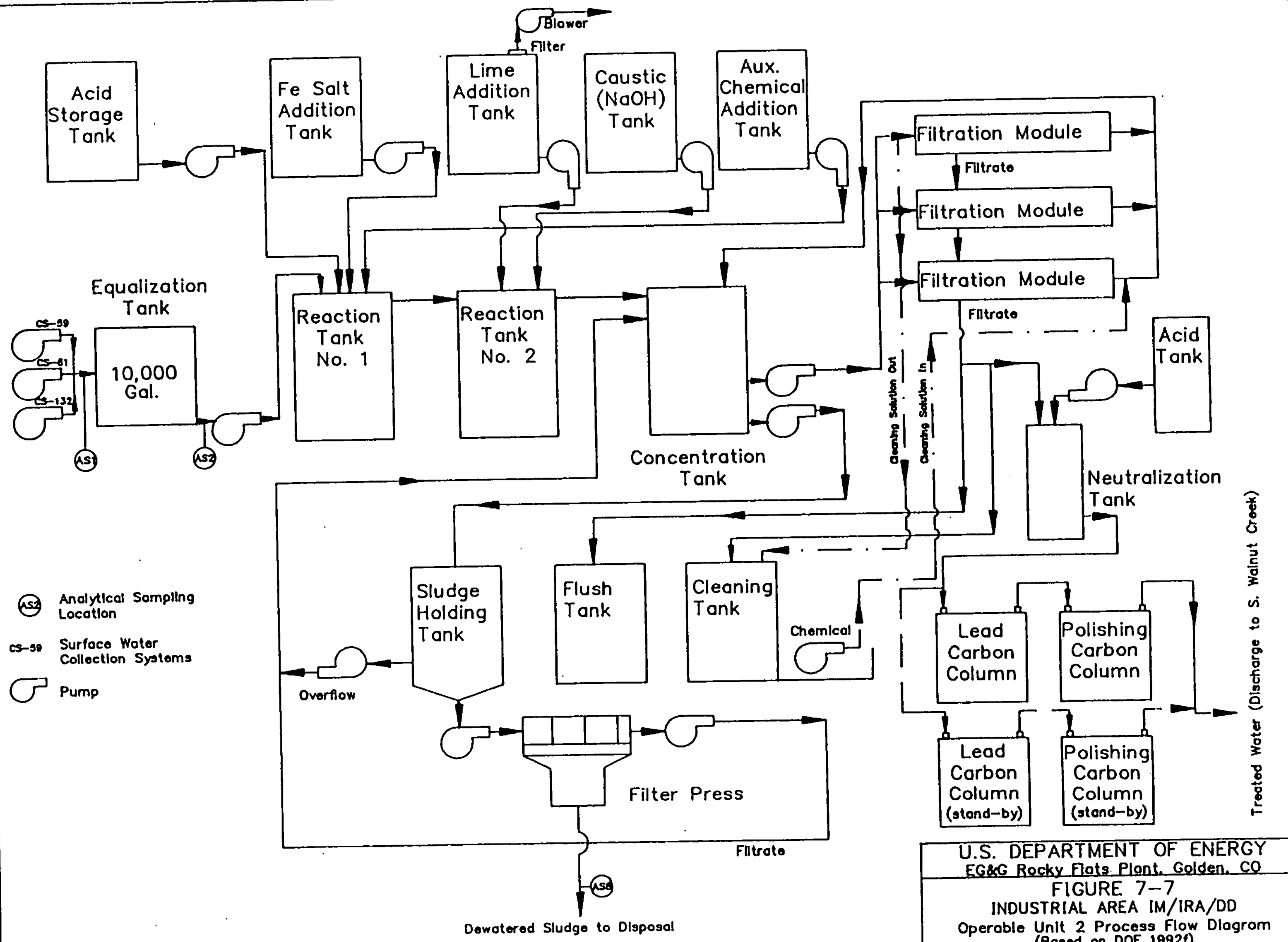
OU2 Treatment Facility. The OU2 treatment facility is located in the South Walnut Creek drainage east of the plant. The facility treats water collected in sumps at SW-59, SW-61, and SW-132. The treatment facility is designed to remove suspended and dissolved radionuclides and metals and volatile organic compounds. The design consists of an influent holding tank, ferric sulfate coagulation, pH precipitation/co-precipitational flocculation/sedimentation followed by cross-membrane filtration, neutralization, and granular activated carbon (GAC). A schematic process diagram is presented in Figure 7-7. The collected water is pumped to a 10,000-gallon influent tank that feeds water to the coagulation/precipitation process where metals and radionuclides are removed. Two parallel trains of two GAC units each have been installed at OU2. The parallel configuration is designed to allow for GAC changes without significant down time. GAC is a commonly used and reliable technology for treatment of a broad range of organic chemicals in water. The service life of a GAC unit in the lead position (first to receive

TABLE 7-3
Industrial Area IM/IRA/DD
OU1 Treatment Facility Acceptance Criteria

Organic Compounds	
Total Volatile and Semivolatile Compounds	1,400 micrograms per liter ($\mu g/L$)
Carbon Tetrachloride	5 $\mu g/L$
Chloroform	15 $\mu g/L$
Vinyl Chloride	To be determined
Radionuclides/Metals	
Plutonium	0.05 picocuries per liter (pCi/L)
Americium	0.05 pCi/L
Total Uranium	400 pCi/L
Total Heavy Metals	1.5 milligrams per liter (mg/L)
Ions	
Chloride	100 mg/L
Nitrate/Nitrite	10 mg/L
Sulfate	250 mg/L
Water Quality Parameter	
Total Dissolved Solids	1,500 mg/L

the influent water) is approximately four months, after which the GAC is regenerated onsite or packaged for disposal as a hazardous waste (EG&G 1991a).

Effluent water is discharged directly into South Walnut Creek. Because there are no tanks to contain the effluent from the OU2 facility, sampling occurs in the final GAC unit. OU2 personnel have recommended that more sampling ports and effluent tanks should be added to the system (EG&G 1993l).



U.S. DEPARTMENT OF ENERGY
EG&G Rocky Flats Plant, Golden, CO
FIGURE 7–7
INDUSTRIAL AREA IM/IRA/DD
Operable Unit 2 Process Flow Diagram
(Based on DOE 1992f)

cc \rflats\tc\OU2_TF.DWG 05H60300

The GAC treatment processes have design capacities of 60 gpm each, yielding a maximum facility capacity of up to 5,184,000 gallons per month if both trains are operated simultaneously. However, the actual capacity is limited to 1,296,000 gallons per month if only one GAC train is operated at a time. The average flow rate is 604,800 gallons per month. During the wet season (March, April, May), the facility operates at or near its capacity (1,296,000 gallons per month) (DOE 1993). The average available capacity for the treatment of incidental/foundation waters is approximately 690,000 gallons per month (16 gpm) except during March, April, and May. The OU2 treatment facility currently is not used to treat incidental/foundation waters; however, it is used to treat water from sources other than OU2.

System limitations of the OU2 treatment facility for treating incidental/foundation waters include the use of a single stage precipitation reactor. Metals precipitate at different pHs. Therefore, the possibility of redissolving precipitated metals is a concern. Other limitations include the significant volume of waste materials generated, the lack of capacity during the wettest periods (March, April, and May), and the difficulty in transporting incidental waters to the facility location (a tanker truck is required). Because of low influent concentrations, the coagulation/precipitation process has shown only limited success with metal and radionuclide removal.

The proposed acceptance criteria for the OU2 treatment facility are presented in Table 7-4. These acceptance criteria can be used as a guideline. The characterization of all incidental/foundation water must be evaluated on an individual or batch basis.

Building 374 - Process Waste Treatment Facility. Building 374 is located in the northwestern portion of the Protected Area on the eastern side of Building 371. The treatment facility consists of an evaporation process where distilled water is produced for reuse and a concentrated salt solution (saltcrete) is stabilized for disposal. Figure 7-8 is a schematic diagram of the 374 waste treatment processes.

TABLE 7-4
Industrial Area IM/IRA/DD
OU2 Treatment Facility Acceptance Criteria

Organic Compounds	
Total Volatile and Semivolatile Compounds (1)	
Carbon Tetrachloride	15 micrograms per liter (μg/L) (2)
Chloroform	15 μg/L (2)
Radionuclides	
Gross Alpha	730 picocuries per liter (pCi/L)
Gross Beta	545 pCi/L
Plutonium	3.3 pCi/L
Americium	0.5 pCi/L
Total Uranium	15.0 pCi/L
Heavy Metals	
Aluminum	400 μg/L
Arsenic	50 μg/L
Barium	2000 μg/L
Beryllium	100 μg/L
Cadmium	5 μg/L
Chromium	100 μg/L
Copper	25 μg/L
Iron	2000 μg/L
Lead	6 μg/L
Manganese	1100 μg/L
Mercury	0.2 μg/L
Nickel	40 μg/L
Selenium	10 μg/L
Zinc	100 μg/L

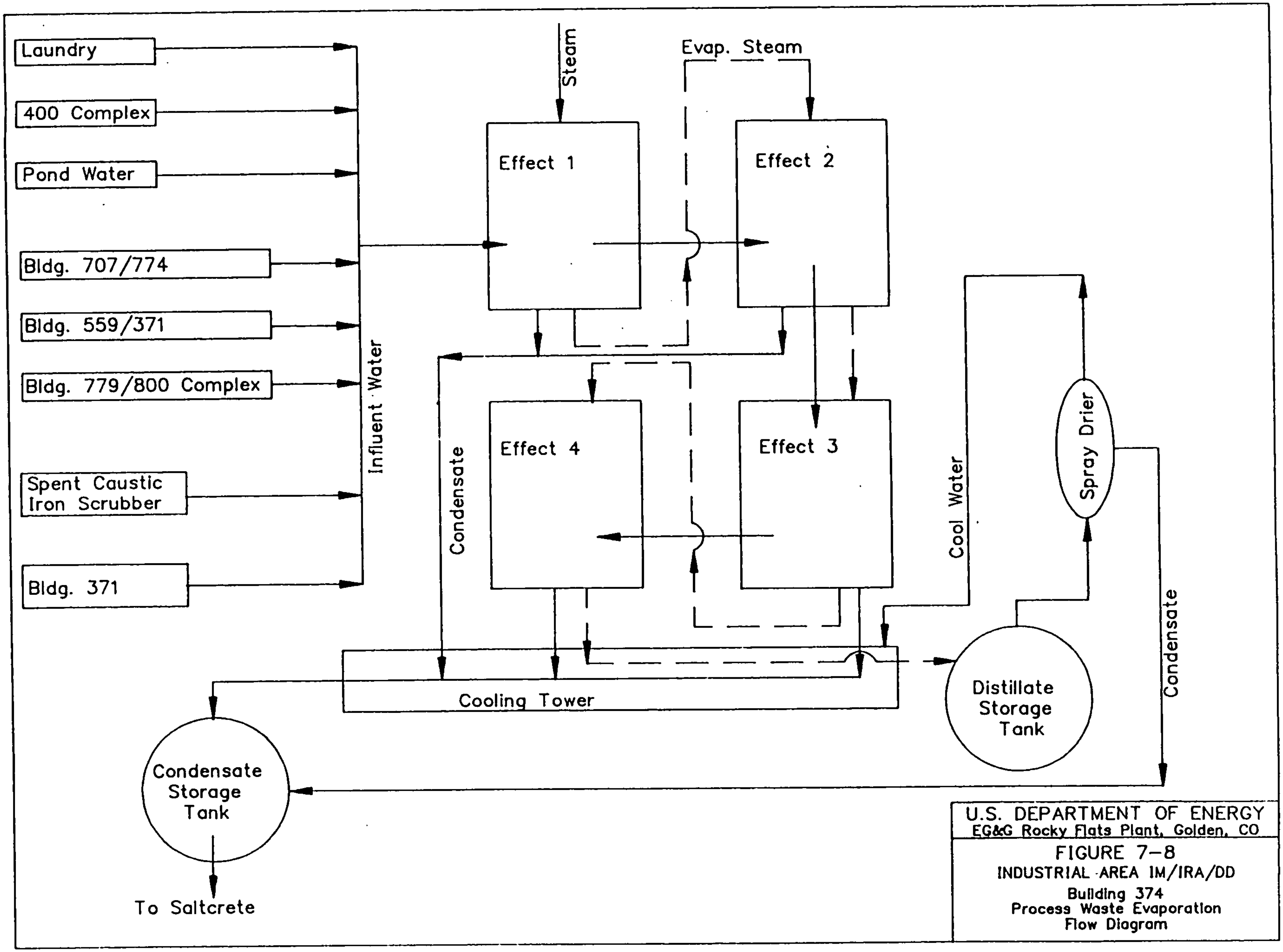
TABLE 7-4
Industrial Area IM/IRA/DD
OU2 Treatment Facility Acceptance Criteria
(continued)

Ions	
Chloride	100 milligrams per liter (mg/L)
Nitrate/Nitrate	10 mg/L
Sulfate	250 mg/L
Water Quality Parameters	
Total Organic Carbon	2 mg/L (3)
Total Dissolved Solids	350 mg/L

Notes:

(1) If any of the following compounds are present, consult the Department of Environmental Operations Management authority: acetone, 2-butanone, methylene chloride, vinyl chloride.
(2) Can be removed by carbon, but capacity will be significantly limited.
(3) Need to characterize further.

The 374 evaporation process can treat up to 1,256,584 gallons per month and historically (during full RFP production) operated at or near capacity. Currently, the facility treats an average of 760,805 gallons per month with approximately 90 percent originating from laundry waste water effluents. This average treatment volume is expected to rise to approximately 900,000 gallons per month during D&D activities. Available capacity for treatment of incidental/foundation waters at Building 374 is expected to remain in excess of 300,000 gallons per month for the foreseeable future. Building 374, by way of Tanks 231A and 231B, currently treats the majority of incidental waters at RFP.



U.S. DEPARTMENT OF ENERGY
EG&G Rocky Flats Plant, Golden, CO

FIGURE 7-8
INDUSTRIAL AREA IM/IRA/DD
Building 374
Process Waste Evaporation
Flow Diagram

C:\RFLATS\TC\374_TF.DWG 05H60300

The treatment facility was designed to accept a variety of diluted wastewater including process wastewater, laundry water, incidental pond water, and desaltable aqueous wastes containing metals, radionuclides, and inorganics. Building 374 has no capabilities for handling organic wastes (EG&G 1992b). Currently, all process wastewaters from the plant process waste collection system are routed to Building 374, where they are neutralized, stored, and characterized before treatment. Waters containing radionuclides or metals greater than the evaporator acceptance criteria are diverted to a precipitation process, which uses hydroxide and/or sulfate precipitation processes. Sludge from the precipitation process is immobilized with cement and disposed of as radioactive waste (saltcrete). Effluent from this process is returned to the evaporation process storage tanks for further treatment. Dilute process wastewaters are sent directly to the evaporation process. Excess (dilute) wastewaters are transferred to Tanks 231A and 231B for storage pending treatment. Environmental waters (i.e., incidental waters, purge waters) that are collected from the plant site in tanker trucks are pumped directly into Tanks 231A and 231B (EG&G 1992c).

The Building 374 treatment system is a flash evaporation process using a four-stage steam-heated reactor with spray evaporation. Water is pumped into the first stage (effect) that heats and circulates the water until it evaporates. The water and steam flow through the four stages under decreasing pressure until the water in the fourth stage can be condensed and contained in an effluent condensate tank for sampling. If the sampling indicates the condensate meets applicable water quality standards, it is recycled for use in the Building 374 cooling tower and steam plant. The concentrated liquid from each stage is collected and stored in the concentrate holding tank until it can be saltcreted and stored (EG&G 1992c). Saltcreting is a process by which a waste is concentrated to 35 percent solids and mixed with portland cement for solidification and stabilization.

Advantages of the 374 treatment facility for the treatment of incidental/foundation waters include a large storage capacity at Tanks 231A and 231B, a consistent, available capacity for treatment, and an ability to accept virtually any mixture of constituents (other than organics) in a broad range of concentrations.

System limitations of the Building 374 treatment facility are that the facility has been in operation for 15 years and is outdated, the inability to treat organic contaminants, and the need to use tanker trucks to transfer incidental/foundation waters to the facility.

The proposed acceptance criteria for Building 374 treatment facility are presented in Table 7-5. These acceptance criteria can to be used as a guideline. The characterization of all incidental/foundation water must be evaluated on an individual or batch basis.

Waste Water Treatment Plant. The WWTP is located in Building 995 outside and east of the Protected Area. The WWTP treats domestic wastewater at RFP and also receives incidental/foundation waters from the foundation drains of Building 559, the 900 area, and possibly other buildings on the plant site. Influent to the WWTP flows through two 60,000-gallon equalization basins (Building 990). The WWTP is a flow-equalized two-train continuous flow-activated sludge system followed by polymer/alum enhanced postsecondary clarification, filtration, chlorination, and dechlorination. Sludge is dried to 43 percent solids before being transported offsite for disposal. Sludge bed leachate is collected and retreated. Effluent water is sampled as it is discharged to Pond B-3 to verify compliance with the current NPDES discharge permit (EG&G 1993m). Figure 7-9 shows a schematic layout of the WWTP.

The design capacity of the WWTP is 21,000,000 gallons per month, but the actual capacity is limited to 15,000,000 gallons per month by operational considerations. The facility receives an average of 4,500,000 gallons per month. During the wet months, it

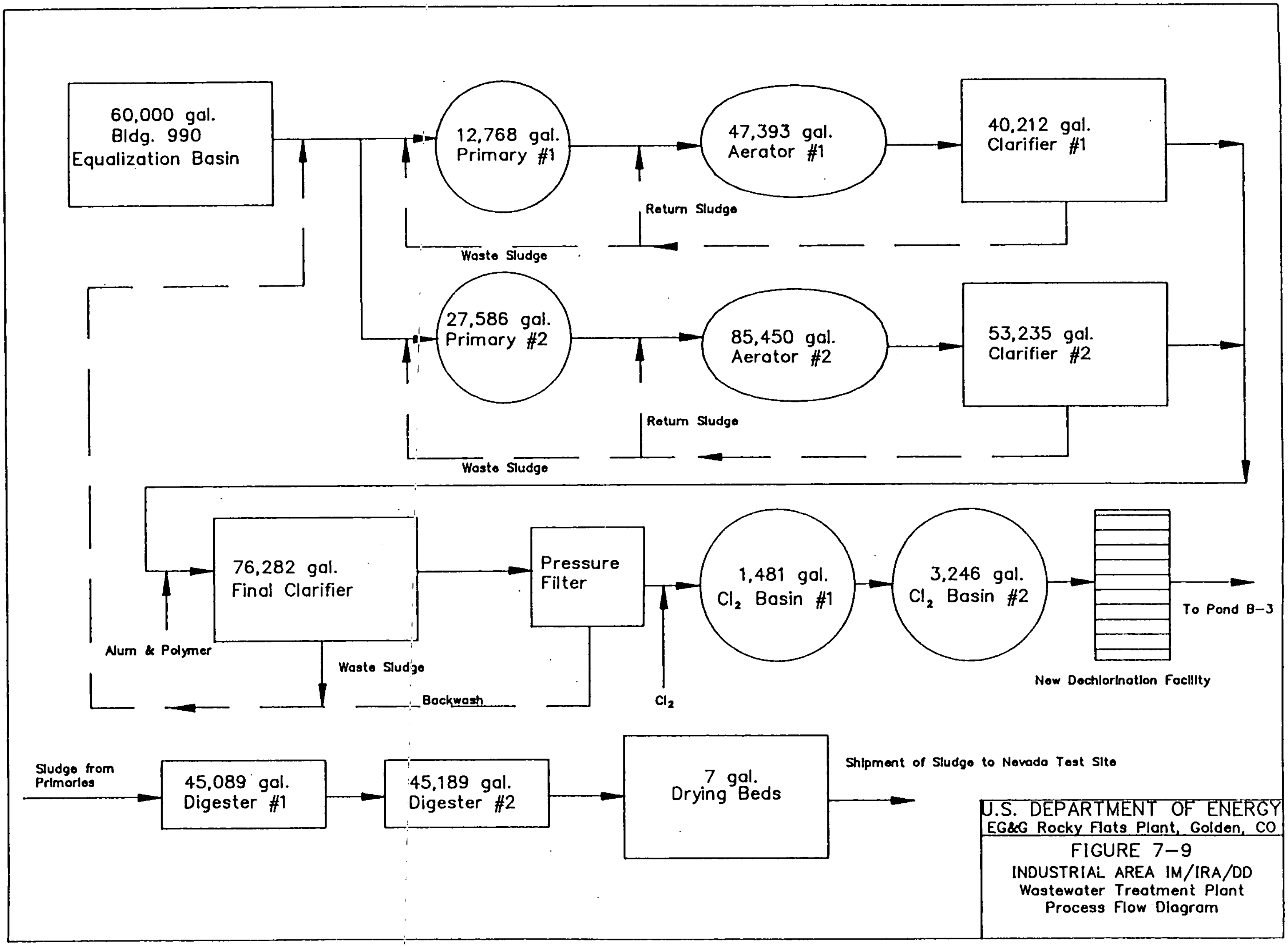
TABLE 7-5
Industrial Area IM/IRA/DD
Building 374 Treatment Facility Acceptance Criteria

Organic Compounds (Building 374 is not designed to treat organics.)	
Vinyl Chloride	0.002 milligrams per liter (mg/L)
Benzene	0.005 mg/L
Carbon Tetrachloride	0.005 mg/L
1,2-Dichloroethane	0.005 mg/L
Trichloroethylene	0.005 mg/L
para-Dichlorobenzene	0.075 mg/L
1,1-Dichloroethylene	0.007 mg/L
1,1,1-Trichloroethane	0.2 mg/L
cis-1,2-Dichloropropane	0.07 mg/L
1,2-Dichloropropane	0.005 mg/L
Ethylbenzene	0.7 mg/L
Monochlorobenzene	0.1 mg/L
o-Dichlorobenzene	0.6 mg/L
Styrene	0.1 mg/L
Tetrachloroethylene	0.005 mg/L
Toluene	1.0 mg/L
trans-1,2-Dichloroethylene	0.1 mg/L
Xylenes (total)	10.0 mg/L
Dichloromethane	0.005 mg/L
1,2,4-Trichlorobenzene	0.07 mg/L
1,1,2-Trichloroethane	0.005 mg/L

TABLE 7-5
Industrial Area IM/IRA/DD
Building 374 Treatment Facility Acceptance Criteria
(continued)

Radionuclides/Metals
<u>Cold Side (Desaltable)</u> Process Liquid to the Evaporator 2.00×10^{-7} grams/liter (g/L) fissile material Laundry water, Clarifier Effluent and Process Waste to the Evaporator 13,500 picocuries per liter (pCi/L) Total Alpha Minimum pH is 6.0 Pond Water to Building 374 and D-231 A and B Tanks for Processing in the Evaporator 13,500 pCi/L Total Alpha Minimum pH is 6.0 <u>Hot Side (Treatable)</u> Building Transfers Pu 4×10^{-3} g/L Am 1×10^{-3} g/L Minimum pH is 2.0 From Tanks or Sumps in Buildings 444, 460, 559, 707, 776, 779, 881, 883, 865, and 889 Fissile Material 1 x 10-3 g/L Tritium 1,000,000 pCi/L Beryllium less than 5 ppm Cyanide less than 50 ppm Minimum pH is 2.0

FINAL



U.S. DEPARTMENT OF ENERGY
EG&G Rocky Flats Plant, Golden, CO
FIGURE 7-9
INDUSTRIAL AREA IM/IRA/DD
Wastewater Treatment Plant
Process Flow Diagram

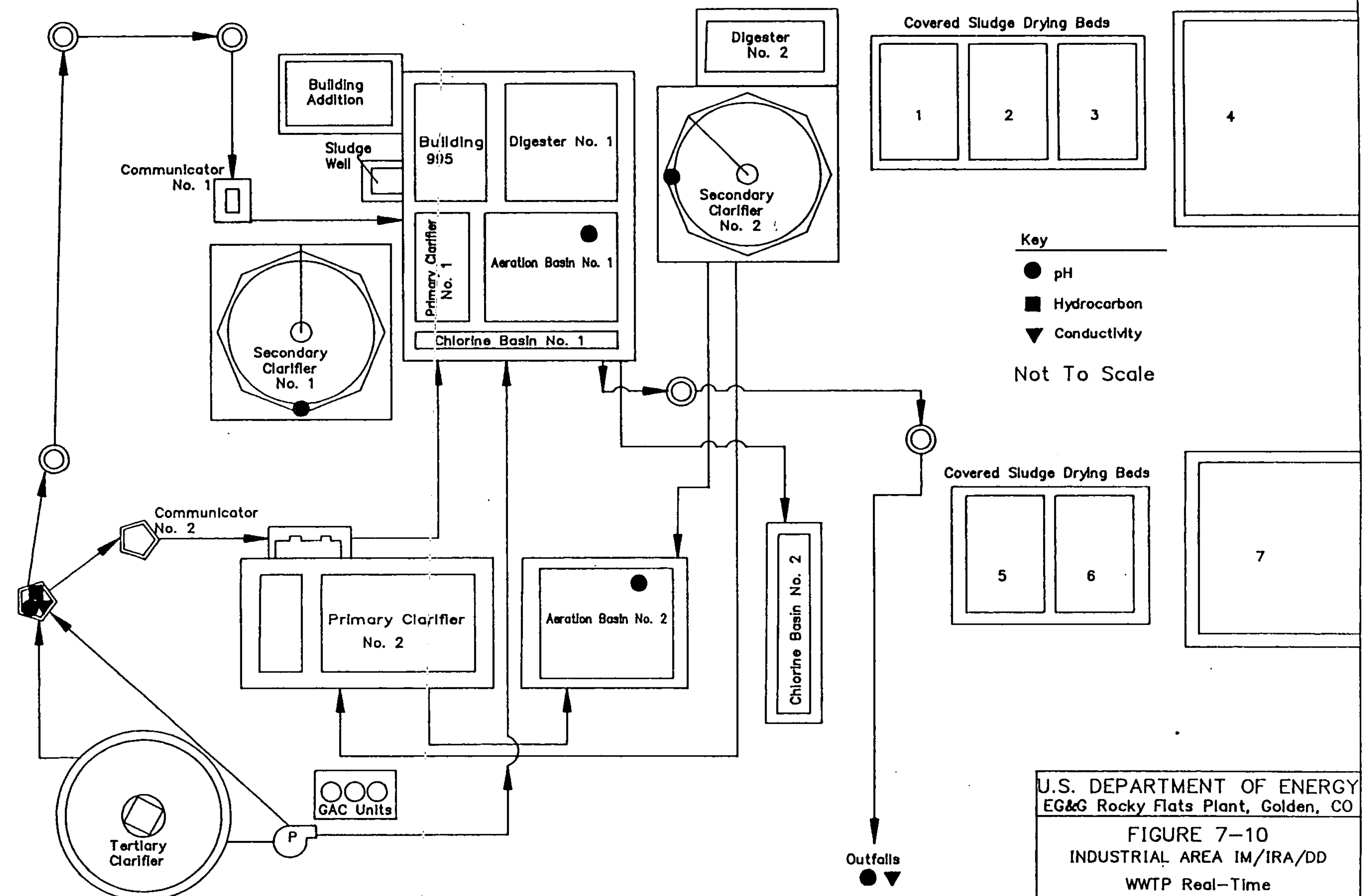
c:\rflats\tc\STP_TF.DWG 05H60300

receives up to 9,500,000 gallons per month (EG&G 1993n). Substantial capacity is available at the WWTP for the treatment of incidental/foundation waters.

WWTP personnel indicated that eight real-time pH monitoring stations are associated with the WWTP. Two are located in the basins, one is located at the final outfall, and the other five are located within Building 995. In addition, there are two real-time conductivity monitors and one real-time hydrocarbon monitor. These locations are shown in Figure 7-10. Specific real-time monitoring capabilities include radionuclides (such as Gamma detectors) and chlorine (EG&G 1993n).

Advantages of the WWTP for the treatment of incidental/foundation waters include the large available capacity, the ability to handle high suspended solids, the ability to treat low levels of organics, and the ease of transport (i.e., waters can be discharged into the nearest sewer manhole). Discharge from the Building 559/561 foundation drain is currently being treated by the WWTP. The Building 559/561 foundation drain water contains less than 500 parts per billion (ppb) carbon tetrachloride (EG&G 1993n).

Treatment process concerns at the WWTP facility include the potential of influent waste becoming chemically contaminated, a situation that upsets the activated sludge organisms and creates potential waste disposal problems with metal or radionuclide-laden sludges. The Department of Energy RFFO requested that EG&G Rocky Flats, Inc. prepare a spill control tankage plan at the WWTP. The plan now set forth to meet this request is presented in a letter, dated July 8, 1994, from T.G. Hedahl, Director of Waste Management, to Mark N. Silverman, Manager DOE RFFO, Attention S. Olinger (Hedahl 1994). This plan currently envisions the construction of two sets of tanks. The first set will consist of the installation of approximately 320,000 gallons of influent storage. The second set will consist of the installation of approximately 550,000 gallons



U.S. DEPARTMENT OF ENERGY
EG&G Rocky Flats Plant, Golden, CO

FIGURE 7–10
INDUSTRIAL AREA IM/IRA/DD

WWTP Real-Time
Monitoring Locations
(Based on Huffman 1993)

NOTE: Two pH monitoring stations are located in the equalization basins.

c:\rflats\ta\STPMON.DWG 05H60300

of effluent storage. The 320,000 gallons of influent storage can also be used as a flow equalization system for the WWTP. Additionally, the influent storage tanks could enhance removal of ammonia and nitrates from the incoming waste stream. It is currently projected that the tank design, construction, and implementation would take 38 months. For planning purposes, the start date of February 6, 1995 is projected.

The proposed acceptance criteria for the WWTP were established by the Surface Water Division at Rocky Flats. Regulated Waste Operations approval is also required after meeting the requirements stated. Problems may result from the introduction of toxic or radioactive contaminants to the digesters, which could potentially cause system upsets or sludge disposition problems (EG&G 1993n). The WWTP can accept dilute waters (<2.5 milligrams per liter [mg/L] of total toxic organic chemicals) and can remove some metals and radionuclides at low concentrations. Other criteria proposed by the Surface Water Division at Rocky Flats for WWTP acceptance include the following:

- a pH value in the range of five (5.0) to ten (10.0) standard units;

- no solid, viscous, or liquid wastes that may cause obstruction to the flow in a collection line or otherwise interfere with the proper operation of the WWTP (Prohibited materials include all solid objects, material, refuse, and debris not normally contained in sewage.);

- no explosive mixtures consisting of liquids, solids, or gases that, by reason of their nature or quantity are or may be sufficient either alone or by interaction with other substances to cause fire or explosion or be injurious in any way to the operation of the WWTP (Prohibited materials include, but are not limited to, gasoline, kerosene, naphtha, benzene, toluene, xylene, ethers, alcohols, ketones, aldehydes, peroxides, chlorates, perchlorates, bromates, carbides, hydrides and sulfates.);

- no flammable substance with a flashpoint lower than 186 degrees Fahrenheit (°F);

- a temperature between 32° and 150° F;

- no grease, oil, or other substance that will solidify or become viscous between 32° and 150° F;

- no improperly shredded garbage (garbage must be ground or comminuted to such a degree that all particles will be carried freely in suspension under flow conditions normally prevailing in the wastewater system; no particle shall be greater than one-half inch in any direction);

- no gases or vapors in concentrations toxic or dangerous to humans or animals;

- no pollutant, including oxygen demanding pollutants (BOD5) released at a rate and/or concentration that has a reasonable potential, in the opinion of the WWTP manager, to adversely affect the WWTP;

- no toxic or irritating substance which will create conditions hazardous to public health and safety;

- no grease or oil or any oily substance from petroleum or mineral origin in excess of 100 ppm;

- no toxic or poisonous solids, liquids or gases in sufficient quantity, either singly or by interaction with other wastes, to injure or interfere with any sewage treatment process, to create any hazard in the receiving water of the WWTP or to contaminate the sludge of any wastewater treatment process;

- no organic toxic pollutants introduced by the intentional or accidental dumping of solvents used in operations involving degreasing, surface preparation, tank washing, paint thinning, paint equipment cleaning or any other process; and

- must not cause the temperature of the treatment plant to exceed 104° F.

Building 774 - Treatment Facility. This treatment facility is located in the northern part of the Protected Area to the east of Building 771. Building 774 is the old process waste treatment facility. The facility is very old and currently functions as a pretreatment facility for process wastewater collected in Buildings 771 and 774 and any plant water containing high radionuclide concentrations. In the past, Building 774 had the capability of treating organics through the "jelly plant" and the OASIS system; currently, these systems are inoperable (EG&G 1993p).

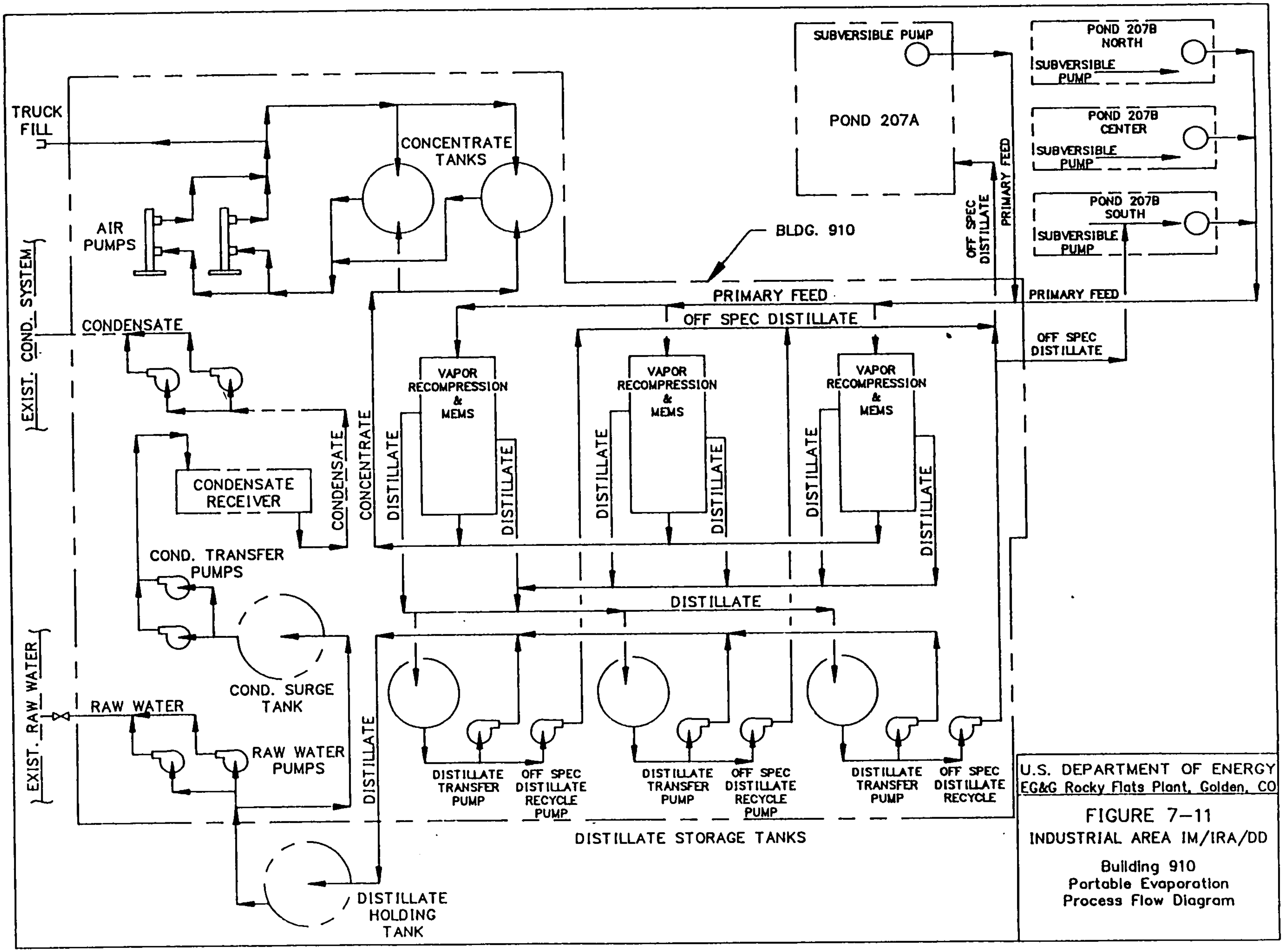
The Building 774 facility is designated for high radiological contaminated waters only. Only waters that exceed the limits of Building 374 are transported to Building 774. The current facility is not designed to handle organic compounds. The treatment facility consists of a precipitation process similar to that described for Building 374. The precipitated wastes are saltcreted and stored, and the liquid effluents are sent to Building 374 for further treatment (Rockwell International 1987). Building 774 could pretreat incidental/foundation waters having high concentrations of radionuclides.

The amount of fissile material received from any building to Building 774 must not exceed 1.5 grams per liter (g/l) in a single transfer and must not exceed the limit for each individual tank or process vessel.

Building 910 - Treatment Facility. Building 910 is located to the south of the 207B series solar ponds. Building 910 houses the treatment system that primarily treats water from the solar evaporation ponds and water contained in the modular storage tanks that collect water from the northern Interceptor Trench of OU4 as a part of the IM/IRA for OU4 (EG&G 1993q). The Building 910 facility consists of three identical units, each consisting of a vapor compression (VC) unit and a multiple-effect multiple-stage (MEMS) evaporator. This system is designed to treat aqueous waste streams containing metals, radionuclides, and nitrates. Similar to Building 374, the VC/MEMS units are unable to treat organic compounds. A schematic process diagram is presented in Figure 7-11. Each VC/MEMS unit receives influent through the manifold station. The water is filtered and then passed through the preheater before entering the VC unit. The concentrate is fed to the MEMS for further concentration. The distillate from the VC/MEMS is collected into small (7,000-gallon) surge tanks and then passed through an in-line conductivity monitor. If the conductivity is less than 150 micromhos per centimeter (μmhos/cm), the water is transferred to a 500,000-gallon distillate holding tank, sampled, and then injected into the Raw Water System for use by the plant cooling towers. If the conductivity is greater than 150 (μmhos/cm) the water is sent back to the VC unit for reprocessing. Concentrate from the VC/MEMS units is collected, sampled for waste characterization, and sent to Building 374 for saltcreting (EG&G 1993q). Each VC/MEMS system has a design capacity of 540,000 gallons per month for a total of 1,620,000 gallons per month (EG&G 1993q).

Currently, the Building 910 treatment facility is not operational. Design problems encountered during system startup testing were sufficient to cause operations to be discontinued. Modifications are necessary to reactivate the system.

FINAL



U.S. DEPARTMENT OF ENERGY
EG&G Rocky Flats Plant, Golden, CO

FIGURE 7-11
INDUSTRIAL AREA IM/IRA/DD

Building 910
Portable Evaporation
Process Flow Diagram

c:\rflats\tc\910_TF.DWG 05H60300

Building 910 was designed primarily as a waste reduction facility targeting radiological-contaminated waters only. This facility is not designed to handle organic compounds. Liquid received into Building 910, at a minimum, will be sampled for pH and gross alpha in picocuries per liter (pCi/L). The acceptance limits for the waste to be processed is at or below 13,500 pCi/L total gross alpha. Wastes exceeding this limit will be handled on a case-by-case basis under the guidance of Operational Health Physics.

A summary of the current methods for disposing of the various wastes that are generated from the treatment facilities at Rocky Flats are presented in Table 7-6. Table 7-7 outlines the treatment capabilities and throughput capacity of each facility.

7.5 ADDITIONAL DATA NEEDS

Several additional data needs were identified during the evaluation of incidental/foundation waters in the Industrial Area. It is important to fully understand the incidental and foundation water system at RFP to propose appropriate actions. These additional data needs are discussed below.

The procedure for control and disposition of incidental water management does not include foundation drain or building sump waters. The CDIW includes incidental waters that are nonroutine resulting from precipitation events and water found in valve vaults. Under this program, incidental water found in valve vaults generally does not require in-depth sampling and analysis for metals, specific radionuclides, or organics. Therefore, the presence of specific potential COPCs is unknown.

The Surface Water Management Plan was developed to monitor discharge locations to the surface water. This plan has provided guidance for monitoring surface discharge locations including foundation drains and building sumps since its existence. Subsequently, an evaluation of the location of foundation drains, sampling frequency, and analytical results, both historical and current, has been performed as part of the OU8

TABLE 7-6
Industrial Area IM/IRA/DD
Current Disposition of Water and Waste
at Active Treatment Facilities at Rocky Flats Plant

FINAL

Treatment Facility	Water Disposition	Waste Disposition
OU1 - UV/Peroxide	Feeds into effluent tanks to be sampled, then released to the South Interceptor Ditech system or retreated if sample levels are unacceptable.	Ion exchange resins are regenerated periodically. The regenerate is transferred to Building 374 for treatment.
OU2 - GAC unit	Discharges directly into South Walnut Creek.	Spent GAC and filter bags are stored onsite. Sludge is stored onsite.
374 - Process Waste	Collected into effluent tanks to be sampled, then recycled to the 374 cooling tower and steam plant.	Wet sludge is saltcreted and stored onsite.
WWTP	Effluent is sampled as it is discharged to Pond B-3.	Dried sludge is packaged and shipped to the Nevada Test Site.
774 - Old Process Waste	Water is transferred to 374 for further treatment.	Wet sludge is saltcreted and stored onsite.
910 - Portable Evaporators	Collected into effluent tanks to be sampled, then injected into the raw water system for use by the plant site cooling towers.	Wet sludge is saltcreted and stored onsite.

Notes:
GAC = granular activated carbon UV = ultraviolet
WWTP = wastewater treatment plant

References: *Rocky Flats Plant Mission Transition Program Management Plan*, Appendix A-3 (EG&G 1992d) and Operational Safety Analysis reports (EG&G 1992c)

TABLE 7-7
Industrial Area IM/IRA/DD
Active Treatment Facilities at Rocky Flats Plant

Treatment	Description	Contaminants Treated	Capacity (gal/month)	Actual (gal/month)	References
OU1	UV/Hydrogen Peroxide and ion exchange	Uranium, hardness, metals, organic chemicals, PCBs, TDS	1,296,000	100,000 ave. 300,000 max.	(EG&G 1993h), (DOE 1993)
OU2	Coagulation, precipitation, flocculation, neutralization, cross membrane filtration, granular activated carbon (GAC)	Solids, metals, organic chemicals, uranium, plutonium, americium	5,184,000 (D) 1,296,000 (A)	604,800 ave. 1,296,000 max.	(EG&G 1991a), (DOE 1993), (EG&G 1993l)
Bldg. 374 - Waste Treatment Facility	Flash evaporation (4-effect steam heated process with spray evaporation)	Salts, inorganics, metals, uranium, americium, plutonium	1,256,584 (A)	760,805 ave. 1,256,584 max.	(ASI 1988), (EG&G 1993r)
Wastewater Treatment Plant (WWTP)	Settling, activated sludge clarification, anaerobic digestion, chlorination/ dechlorination	Biological, nitrates, phosphorous, chlorides, chromium, solids, organic matter, metals, <500 ppb organics	21,000,000 (D) 15,000,000 (A)	4,500,000 ave. 9,500,000 max.	(ASI 1991e), (EG&G 1993m)
Bldg. 774 - Old Waste Treatment Facility	Precipitation with iron sulfate, ship to 374 for further treatment	Solids, chemical compounds, metals, high levels of uranium, plutonium, americium	Services only water from 771, 774, and bottled water	Not available	(EG&G 1993l), (EG&G 1993p)
Bldg. 910	Vapor compression, multi-effect, multi-stage process with spray evaporation	Salts, inorganics, uranium, plutonium, americium, metals	3 units at 540,000 1,620,000 (D)	Limited operational history	(EG&G 1993l)

(A) = Actual capacity
(D) = Design capacity
PCBs = Polychlorinated Biphenyls
UV = Ultraviolet
TDS = Total Dissolved Solids

RFI/RI. Additional data needs associated with the management of surface water discharge include the volume of flow at specific foundation drain locations and inconsistent sampling of specific contaminants. It appears that some foundation drains are being sampled at inappropriate locations, and other key locations have not been sampled. Additionally, this program does not include a disposition plan for foundation drains and building sump waters.

The ultimate destination of the water from some of the building sumps is unknown. Some, but not all, of the building sumps are routed to the process waste system. It is necessary to understand these other destinations to fully understand the sump collection system.

In some areas, the foundation drain sampling locations suddenly went dry. It is necessary to understand the cause of this. If construction in the area resulted in rerouting or capping these drains, documentation on where, when, and how this was performed needs investigation. If the pipes have broken or collapsed, this also requires verification.

7.6 PROPOSED ACTIONS FOR MONITORING AND DISPOSITION

As discussed in Section 7.5, there are several additional data needs that exist pertaining to the complete characterization of incidental/foundation waters in the Industrial Area. These additional data needs should be addressed before comprehensive proposed actions concerning the monitoring and disposition of incidental and foundation waters are finalized. The following subsections present proposed revisions to the existing program and proposed actions for treatment options.

7.6.1 Monitoring

Understanding more about incidental/foundation waters at RFP is necessary to enhance the current incidental waters management programs. The following list consists of proposed actions for improving the general management of incidental waters at RFP.

1. A list of characterization analytes has been developed for incidental foundation drains and building sump waters based on the acceptance criteria from existing treatment facilities and is summarized in Table 7-8. This list will be appended to the programs plans addressing the management of incidental foundation drain and building sump water.

2. To characterize each foundation drain location of interest, quarterly monitoring of flow and water quality will be sufficient to address seasonal fluctuations in the Industrial Area. On a site-specific basis, foundation drain flow and water quality may need to be monitored more frequently than on a quarterly basis. Increased monitoring frequency will be based on the water quality characteristics and temporal flow and chemical concentration fluctuations. Foundation drain monitoring will be conducted according to the *OU8 Technical Memorandum* (EG&G 1994).

3. Field documentation for sampling and monitoring will be revised to include dates, volumes, water quality parameters, and flow. These records will be managed in a document control system.

4. The final destinations of building sump discharges will be established.

5. The CDIW will be appended to include a more detailed analyte list for characterization of valve vault water.

6. The surface water management plan will be appended to monitor all foundation drains and building sumps not previously identified.

TABLE 7-8
Industrial Area IM/IRA/DD
Foundation Drain Characterization List

Water Quality Parameters Total Dissolved Solids Temperature Total Organic Carbon pH Dissolved Oxygen TPH Conductivity Ions Chloride Nitrate/Nitrite Sulfate Cyanide Metals Aluminum Arsenic Barium Beryllium Cadmium Chromium Copper Iron Lead Manganese Mercury Nickel Selenium Zinc Radionuclides Gross Alpha Gross Beta Plutonium Americium Total Uranium Fissile material Tritium	Total Volatile and Semivolatile Compounds Carbon Tetrachloride Chloroform Vinyl Chloride acetone, 2-butanone, methylene chloride, Benzene 1,2-Dichloroethane Trichloroethylene para-Dichlorobenzene 1,1-Dichloroethylene 1,1,1-Trichloroethane cis-1,2-Dichloropropane 1,2-Dichloropropane Ethlybenzene Monochlorobenzene o-Dichlorobenzene Styrene Tetrachloroethylene Toluene trans-1,2-Dichloroethylene Xylenes (total) Dichloromethane 1,2,4-Trichlorobenzene 1,1,2-Trichloroethane Total Toxic Organics Items/Constituents to be considered: obstructive material explosive mixtures (LEL) flammable substance with a flashpoint lower than 186 degrees F

Based on these monitoring program proposed actions, information will be collected and used to assist IM/IRA personnel with incidental/foundation drain water management during D&D activities.

7.6.2 Disposition

As discussed in Section 7.3.3, incidental/foundation waters are currently managed under existing approved procedures. The requirements for incidental/foundation waters disposition can be summarized as capture, analyze, treat if necessary, and dispose as appropriate.

Foundation drain and building sump waters may contain suspended solids, dissolved metals, radionuclides, inorganics, and organic chemicals. Concentrations are expected to be relatively diluted; thus, selected potential treatment facilities must be capable of effective treatment at low concentrations. Potential treatment facilities include OU1, OU2, Building 374, Building 774, and the WWTP. Capabilities for treatment of incidental waters are limited at OU1, OU2, and Building 774 treatment facilities. These facilities were designed for specific needs.

With the exception of organics, treatment facilities in Building 374 and the WWTP are capable of treating the majority of contaminated waters. If incidental/foundation waters contain concentrations of organic chemicals above levels that can be treated at the WWTP, OU1 and OU2 treatment facilities may accept water if it meets acceptance criteria. It may be necessary to incorporate a pretreatment for incidental/foundation water at the source if acceptance criteria are not met. Technologies used for pretreatment of incidental/foundation waters will be based on the availability of Building 374 and the WWTP for further, more complete treatment. Incidental/foundation water characterization will determine whether pretreatment is required.

Because of the diverse locations of incidental/foundation waters and generally low concentrations, pretreatment technologies will have the following characteristics:

- Portable: Treatment systems that can be moved in and set up quickly at varying locations will alleviate the need for large storage or the need to transport suspect waters by tanker truck to a central storage location.

- Modular: The diversity of potential contaminants requires a diversity of treatment technologies. These technologies do not necessarily need to address all potential contaminants but must be capable of handling the majority of expected contaminants.

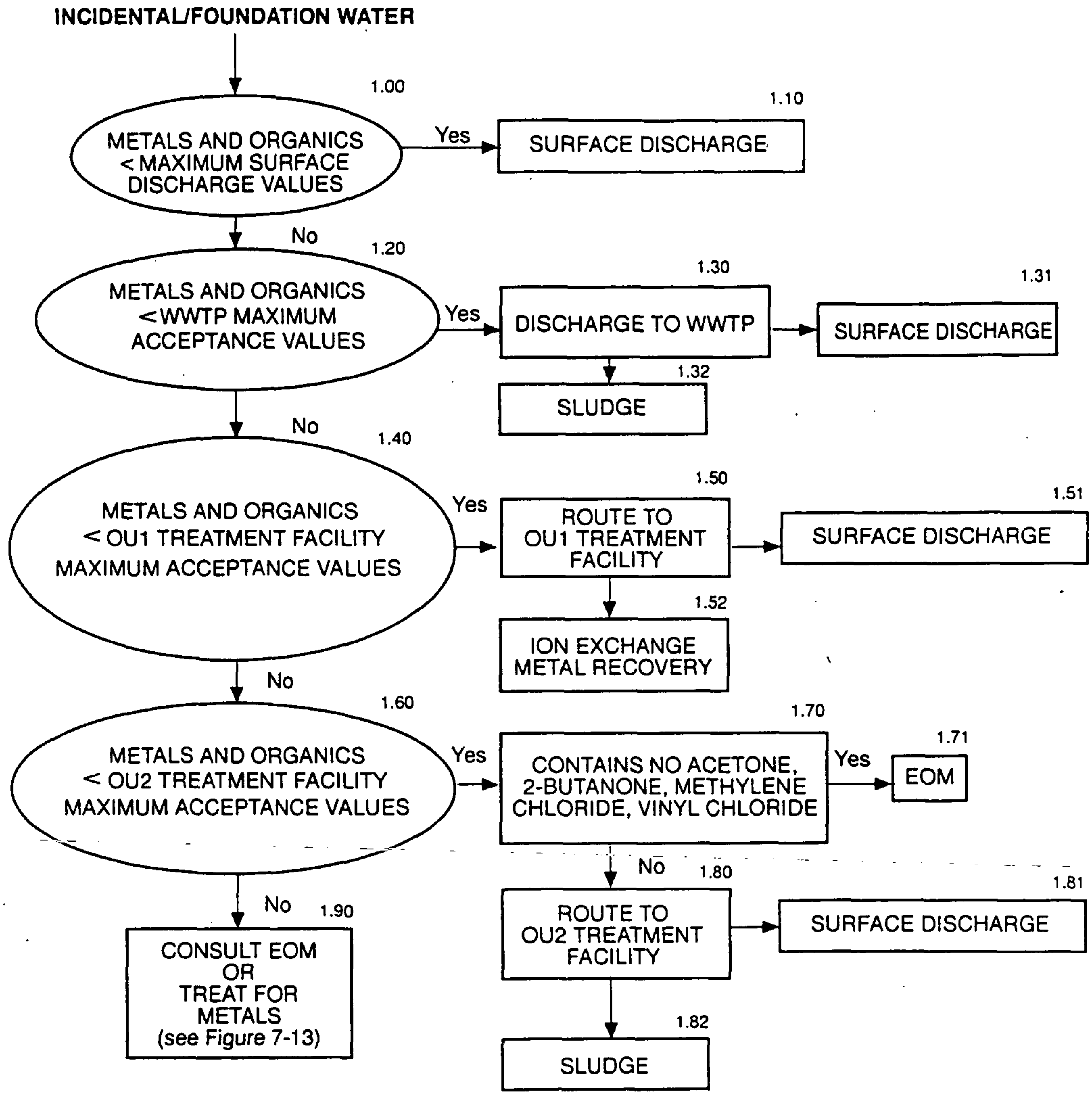
- Influent/Effluent Storage: Influent tankage of 5,000 to 10,000 gallons allows for flow control to necessary treatment facilities. Effluent tankage allows for water quality monitoring before disposition of the water.

- Sediment Filtration: Although the majority of incidental waters are not expected to have high concentrations of solids, prefiltration of TSS will be necessary to protect or enhance other treatment processes. Filtration may also be capable of reducing metals and/or radionuclides.

It is important to note that, currently, no onsite facilities appear to have the capability of handling water with all of the possible contaminants. Some existing facilities, however, could be modified. This is currently being investigated by EG&G.

Figures 7-12 and 7-13 present the Incidental/Foundation water treatment decision flow diagrams. Tables 7-9 and 7-10 present the descriptions of the Incidental/Foundation water treatment decision flow diagrams. These figures and tables do not reflect available capacity and are presented as a general guide for incidental/foundation water disposition.

FIGURE 7-12
INDUSTRIAL AREA IM/IRA/DD
INCIDENTAL/FOUNDATION WATER TREATMENT
DECISION FLOW DIAGRAM FOR MIXED WASTE



NOTE:

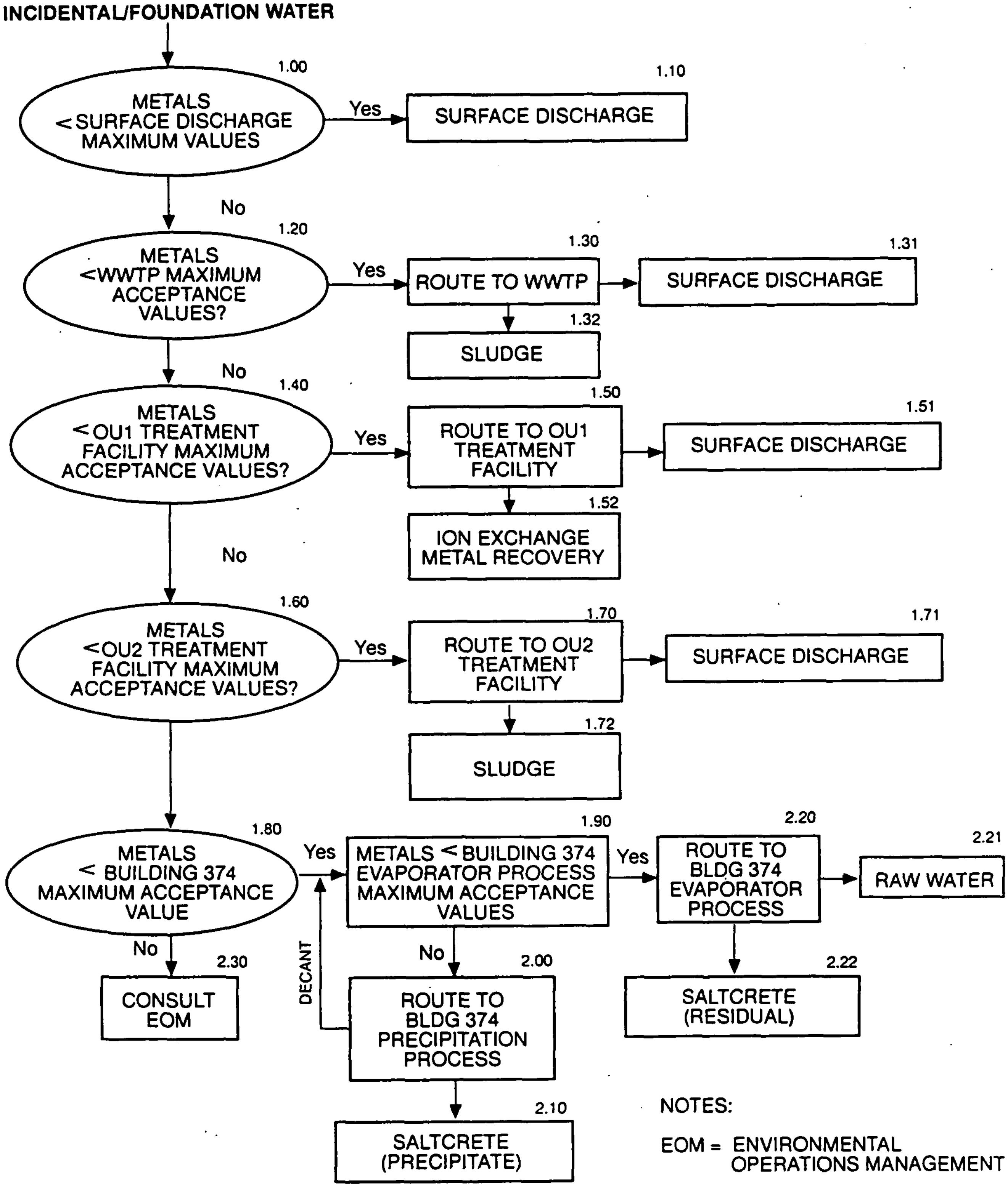
EOM = ENVIRONMENTAL OPERATIONS MANAGEMENT

FOR NUMBER REFERENCE, SEE TABLE 7-10

h:\wp\flats\graphics\f-cld4 7/11/94 (aldus)

FIGURE 7-13
INDUSTRIAL AREA IM/IRA/DD
INCIDENTAL/FOUNDATION WATER TREATMENT
DECISION FLOW DIAGRAM FOR METALS

FINAL



NOTES:

EOM = ENVIRONMENTAL OPERATIONS MANAGEMENT

FOR NUMBER REFERENCE, SEE TABLE 7-11

TABLE 7-9
Industrial Area IM/IRA/DD
Description of Incidental/Foundation Water Treatment
Decision Flow Diagram for Mixed Waste

TREATMENT FLOW/DECISION	NARRATIVE
1.00 Metals and Organics < Maximum Surface Discharge values	Refer to Figure 7-5, Industrial Area IM/IRA/DD, Flow Chart B: Surface Water Discharge Determination for Foundation Drains and Utility Pits
1.10 Surface discharge	Criteria stated in 1.00 is met. Release Incidental/Foundation water to storm drainage.
1.20 Metals and Organics < the wastewater treatment plant (WWTP) maximum acceptance values	Refer to discussion of acceptance criteria for the WWTP in Section 7.4.
1.30 Discharge to WWTP	Criteria stated in 1.20 is met. Incidental/Foundation water is discharged to the WWTP for treatment.
1.31 Surface discharge	Water from the WWTP meets effluent standards and is discharged to the B series ponds.
1.32 Sludge	Accumulated sludge waste in the WWTP process is dried and drummed.
1.40 Metals and organics < the OU1 treatment facility maximum acceptance values	Refer to Table 7-4, Industrial Area IM/IRA/DD, OU1 Treatment Facility Acceptance Criteria
1.50 Route to OU1 treatment facility	Criteria stated in 1.40 is met. Incidental/Foundation water is routed to the OU1 treatment facility.
1.51 Surface discharge	Treated water from the OU1 treatment facility meets effluent standards and is discharged to the C series ponds.
1.52 Ion-Exchange metal recovery	The ion-exchange columns are regenerated for metal recovery.
1.60 Metals and organics < the OU2 treatment facility maximum acceptance values	Refer to Table 7-5, Industrial Area IM/IRA/DD, OU2 Treatment Facility Acceptance Criteria
1.70 Contains no acetone, 2-butanone, methylene chloride and vinyl chloride	Organics listed are not effectively treated by carbon absorption.
1.71 EOM	Contact the Depart of Environmental Operations Management.

TABLE 7-9
Industrial Area IM/IRA/DD
Description of Incidental/Foundation Water Treatment
Decision Flow Diagram for Mixed Waste

TREATMENT FLOW/DECISION	NARRATIVE
1.80 Route to OU2 treatment facility	Criteria stated in 1.60 & 1.70 have been met. Incidental/Foundation water is routed to the OU2 treatment facility.
1.81 Surface discharge	Treated water from the OU2 treatment facility meets effluent standards and is discharged to South Walnut Creek.
1.82 Sludge	Sludge generated from the OU2 treatment process is drummed.
1.90 Consult EOM or treat for metals (Refer to Figure 7-13)	If organics do not meet criteria stated in 1.60 and 1.70, consult the Department of Environmental Operations Management. If metals do not meet the criteria stated in 1.60, continue to treat for metals. Refer to Figure 7-13, Industrial Area IM/IRA/DD, Incidental/Foundation Water Decision Flow Diagram for Metals.

7.7 SUMMARY OF AVAILABLE DATA

Because large amounts of data are available concerning RFP, it is necessary to select specific documents that provide key information for evaluating the current water management program and potential water treatment technologies. The first document evaluated was the August 12, 1993 draft *Control and Disposition of Incidental Waters* written by EG&G Surface Water Division (EG&G 1993a). This document identified other documents and sources of information. The documents that were reviewed for this section and the general content of each document is listed in Table 7-11. These documents are listed alphabetically according to their titles. Personal interviews were conducted to confirm information concerning current Rocky Flats treatments, foundation drain locations, and the ongoing Drain Identification Study (DIS) (EG&G 1993r). Surface Water Division personnel were also interviewed to provide complete information.

TABLE 7-10
Industrial Area IM/IRA/DD
Description of Incidental/Foundation Water Treatment
Decision Flow Diagram for Metals

TREATMENT FLOW/DECISION	NARRATIVE
1.00 Metals < Maximum surface Discharge values	Refer to Figure 7-5, Industrial Area IM/IRA/DD, Flow Chart B: Surface Water Discharge Determination for Foundation Drains and Utility Pits
1.10 Surface discharge	Criteria stated in 1.00 is met. Release Incidental/Foundation water to storm drainage.
1.20 Metals < WWTP maximum acceptance values	Refer to discussion of acceptance criteria for the WWTP in Section 7.4.
1.30 Route to WWTP	Criteria stated in 1.20 is met. Incidental/Foundation water is discharged to the WWTP for treatment.
1.31 Surface discharge	Water from the WWTP meets effluent standards and is discharged to the B series ponds.
1.32 Sludge	Accumulated sludge waste in the WWTP process is dried and drummed.
1.40 Metals < OU1 treatment facility maximum acceptance values	Refer to Table 7-4, Industrial Area IM/IRA/DD, OU1 Treatment Facility Acceptance Criteria
1.50 Route to OU1 treatment facility	Criteria stated in 1.40 is met. Incidental/Foundation water is routed to the OU1 treatment facility.
1.51 Surface discharge	Treated water from the OU1 treatment facility meets effluent standards and is discharged to the C series ponds.
1.52 Ion-Exchange metal recovery	The ion-exchange columns are regenerated for metal recovery.
1.60 Metals < OU2 treatment facility maximum acceptance values	Refer to Table 7-5, Industrial Area IM/IRA/DD, OU2 Treatment Facility Acceptance Criteria
1.70 Route to OU2 treatment facility	Criteria stated in 1.60 is met. Incidental/Foundation water is routed to the OU2 treatment facility.
1.71 Surface discharge	Treated water from the OU2 treatment facility meets effluent standards and is discharged to South Walnut Creek.

TABLE 7-10
Industrial Area IM/IRA/DD
Description of Incidental/Foundation Water Treatment
Decision Flow Diagram for Metals

1.72 Sludge	Sludge generated from the OU2 treatment process is drummed.
1.80 Metals < Building 374 maximum acceptance values	Refer to Table 7-6, Industrial Area IM/IRA/DD, Building 374 Treatment Facility Acceptance Criteria
1.90 Metals < Building 374 evaporator process maximum acceptance values	Refer to Table 7-6, Industrial Area IM/IRA/DD, Building 374 Treatment Facility Acceptance Criteria
2.00 Route to Building 374 precipitation process	Metals will be precipitated by pH or chemical agents. Decant will be routed to 1.90, the evaporator maximum acceptance values in flow diagram.
2.10 Saltcrete (precipitate)	The precipitate from 2.00 will be saltcreted.
2.20 Route to Building 374 evaporator process	Criteria stated in 1.90 is met. Incidental/Foundation water is routed to Building 374 evaporator process for treatment.
2.21 Raw water	Decant from the evaporator process if meeting effluent standards is routed to the raw water system.
2.22 Saltcrete (Residual)	Residual from the evaporator process is dried to 35% solids and saltcreted.
2.30	Contact the Department of Environmental Operations Management.

Engineering drawings were reviewed in detail to accurately locate each of the foundation drains, building sumps, valve vaults, and utility pits that could potentially intersect the groundwater. Table 7-12 presents a cross reference of foundation drain and engineering drawings.

TABLE 7-11
Industrial Area IM/IRA/DD
Selected Incidental Water References Collected
for the Rocky Flats Plant IM/IRA/DD

FINAL

DOCUMENT	INFORMATION/LEVEL
A Description of Rocky Flats Foundation Drains (EG&G 1992f)	Foundation drain locations
Analysis of Precipitation Occurrences in Los Alamos, New Mexico, for Long-Term Predictions of Waste Repository Behavior (Nyhan 1989)	Meteorology of Los Alamos, N/A
Annual Report for Treatability Studies at Rocky Flats Plant, Fiscal Year 1991 (DOE 1992)	Different test treatments Very good information
Annual Report for Treatability Studies at Rocky Flats Plant, Fiscal Year 1992 (DOE 1993)	Updated test treatments Very good information
Catalogue of Monitoring Activities (EG&G 1991b) Tables 4-9 & 4-12.	Sec. 4-Foundation Drain, Building Sump, Incidental Waters monitoring summaries
Demonstration of the Colloid Polishing Filter Method. Program Fact Sheet (EPA 1993)	Test of CPFM
Design and Engineering of the UMTRA Mobile Waste Treatment Plant (Conroy 1989)	Design specifications for treatment designed by AIChE
Engineering Evaluation/Cost Analysis for the Proposed Management of Contaminated Structures at the Weldon Spring Chemical Plant (DOE 1991)	List of decommissioning and disassembling activities
Environmental Constituents in the Rocky Flats Area Non Facility Related Sources Pertinent to Water Quality (Morgan 1990)	Nonpoint source water quality
Evaluation of Treatment Alternatives for Storm Water in Ponds A-4, B-5, and C-2: Final Report (EG&G 1990)	Twelve alternatives for treating RFP pond water
Final Phase Work Plan for OU9 (EG&G 1993r)	Chemicals of concern
Final Safety Analysis Report - Building 774 (Rockwell International 1987)	Building 774 treatment UCNI document
Guide to Treatment Technologies for Hazardous Wastes at Superfund Sites (EPA 1989)	Biological, chemical, physical, and thermal treatments
Hydrology of a Nuclear Processing Plant Site (Hurr 1976) Sections 2.3 and 2.6	Basic geologic/hydrologic information

TABLE 7-11
Industrial Area IM/IRA/DD
Selected Incidental Water References Collected
for the Rocky Flats Plant IM/IRA/DD

FINAL

DOCUMENT	INFORMATION/LEVEL
Installation Work Plan for Environmental Restoration Clean-up Program. Vol. 1 (LANL 1992a)	Describes RCRA Facility Investigation, CMS, CMI, technical process
Installation Work Plan for Environmental Restoration Clean up Program. Vol. 2 (LANL 1992b)	N/A
Low-Level Integrated System Test (LANL 1986)	N/A
Non-Storm Water Discharge Locations and Sampling at Rocky Flats (EG&G 1993c)	Drain locations
Operational Safety Analysis for Building 374 Evaporators (EG&G 1992c)	Building 374 evaporators
Operational Safety Analysis for Building 910 Evaporators (EG&G 1993q)	Building 910 evaporators
Proposed IM/IRA/DD for the Solar Evaporation Ponds, OU4 (EG&G 1992e)	Solar pond/Interceptor Trench System information
Rocky Flats Surface Water Monitoring Program (EG&G 1992a)	Surface water management Water quality standards
Sampling and Analysis Plan, Surface Water IM/IRA, South Walnut Creek Basin OU2, Granular Activated Carbon Treatment System (EG&G 1991a)	N/A
Summary of Technologies for Remediation of Aquifers (Keddy 1989)	Methods for remediation of aquifers
Ultrox International Ultraviolet Radiation/Oxidation Technology: Applications Analysis Report (EPA 1990)	Information on skid-mounted oxidation treatment
Water Management Alternatives for the Rocky Flats Plant (EG&G 1988)	Information on treatments Contains regulations and NPDES permit information Possibly old information
Work Plan for Field Treatability Study, South Walnut Creek Basin Surface Water IM/IRA (EG&G 1991c)	OU2 treatment capability
Sanitary Sewer Infiltration/Inflow and Exfiltration Study: RFP: Task 1 of the Zero-Offsite Water-Discharge Study (EG&G 1991d)	Water balance for sewer system, manhole information, water usage

TABLE 7-11
Industrial Area IM/IRA/DD
Selected Incidental Water References Collected
for the Rocky Flats Plant IM/IRA/DD

DOCUMENT	INFORMATION/LEVEL
Non-Point Source Assessment and Storm-Sewer Infiltration/Inflow and Exfiltration Study: RFP: Tasks 2&3 of the Zero-Offsite Water-Discharge Study (EG&G 1991e)	Quantity/quality study for WWTP and nonsource points
Solar Ponds Interceptor Trench System: Groundwater Management Study, RFP: Task 7 of the Zero-Offsite Water-Discharge Study (EG&G 1991f)	Interceptor Trench Pump House flow estimates and balances, groundwater management, concentrations of chemicals of concern, treatment alternatives
Sanitary Treatment Plant Evaluation Study: RFP: Task 10 of the Zero-Offsite Water-Discharge Study (EG&G 1991g)	Good current WWTP information, recommendations
Reverse Osmosis and Mechanical Evaporation Study: RFP: Task 12 of the Zero-Offsite Water-Discharge Study (EG&G 1991h)	Reverse Osmosis pretreatment information
Surface Water Evaporation Study: RFP: Task 15 of the Zero-Offsite Water-Discharge Study (EG&G 1991i)	Calculations, ~45" total evaporation each year from the ponds at RFP
Alternatives to Zero Discharge: Task 17 of the Zero Offsite Water-Discharge Study (EG&G 1991j)	Off/onsite water release/use alternatives for Sewage Treatment Plant, storm water, groundwater, no treatments
Report on Drain Investigations: RFP: Task 18 of the Zero-Offsite Water-Discharge Study (EG&G 1991k)	Information on two ongoing studies: NPDES Drain Verification Activity and Drain Identification Study
Raw, Domestic and Industrial Water Pipeline Leak Detection Method Study: Task 20 of the Zero-Offsite Water-Discharge Study (EG&G 1991l)	Leak detection methods, N/A
Temporary Water Storage Capabilities Study: Task 21 of the Zero-Offsite Water-Discharge Study (EG&G 1991m)	Considers onsite storage relative to zero discharge, water shed yield equation

TABLE 7-11
Industrial Area IM/IRA/DD
Selected Incidental Water References Collected
for the Rocky Flats Plant IM/IRA/DD

FINAL

DOCUMENT	INFORMATION/LEVEL
Feasibility of Groundwater Cutoff/Diversion Study Task 26 of the Zero-Offsite Water-Discharge Study (EG&G 1991n)	Secondary scope, 4 alternatives for reducing groundwater flow, no supporting documentation included

AIChE = American Institute of Chemical Engineers
CMI = Corrective Measures Implementation
CMS = Corrective Measures Study
CPFM = Colloid Polishing Filter Method
DOE = U.S. Department of Energy
EPA = U.S. Environmental Protection Agency
IM = Interim Measures
IRA = Interim Remedial Action
IT = IT Corporation
LANL = Los Alamos National Laboratory
N/A = Not Applicable
NPDES = National Pollutant Discharge Elimination System
OSA = Operational Safety Analysis
OU = Operable Unit
RFP = Rocky Flats Plant
UCNI = Unclassified Controlled Nuclear Information
UMTRA = Uranium Mill Tailings Remedial Action
WWTP = wastewater treatment plant

TABLE 7-12
Industrial Area IM/IRA/DD
Foundation Drains and Foundation Drawings Cross Reference

Building No. 111

Drawing No.	Original Date	Latest Rev. Date	Title
RF-11-F-1-C	1-6-51	N/R	Foundation and Basement Plan - Schedule and Details
RF-11-S-1-C	1-6-51	N/R	First Floor Plan (South) and Foundation Plan
1-1664-11	10-8-51	1-8-65	Basement Floor Plan (South)
1-1665-11	10-8-51	2-27-61	Basement Floor Plan (North)
14140-1	5-18-66	4-9-68	Meeting Room Addition - Foundation and First Floor Plan and Foundation Details
25581-8	12-9-75	N/R	Foundation Drain Plan
15501-026-M	7-20-83	7-20-90	Site Utility Plans
15501-027-M	7-20-83	7-20-90	Site Utility Plans
11508-11, 21, and 22	N/L	N/L	Grading Plan

Building No. 122

Drawing No.	Original Date	Latest Rev. Date	Title
1-13122-21, 22	11-6-51	N/L	Foundation Plan and Details
21641-11	8-18-69	10-28-71	Building 122 Addition and Renovations Foundation Plan
15501-040-M	7-20-83	7-20-90	Utility Layout

Building No. 123

Drawing No.	Original Date	Latest Rev. Date	Title
1-11588-23	10-31-51	2-7-52	Foundation Plan
1-11589-23	10-31-51	2-7-52	Foundation Details
1-11571-23	11-6-51	2-7-52	Toilet Room Layout and Source Vault Details
RF-23-101	11-30-51	9-11-53	Plumbing and Service Piping - Drains
20712-02	5-17-68	12-21-70	Plot and Drainage Plan
15501-040-M	7-20-83	7-20-90	Utility Layout

TABLE 7-12
Industrial Area IM/IRA/DD
Foundation Drains and Foundation Drawings Cross Reference

Building No. 124

Drawing No.	Original Date	Latest Rev. Date	Title
RF-24-F1-C	3-24-52	3-19-53	Foundation Plan
RF-24-Y1-B	3-26-52	3-19-53	Plot Plan - Grading
RF-24-109-B	3-26-52	3-19-53	Outfall Sewer
27006-4	5-15-74	6-18-75	Backwash Storage Tanks Layout
25581-3	6-13-75	12-9-75	Foundation Drain Plan
15501-051-M	7-20-83	7-20-90	Site Utility Plans

Building No. 125

Drawing No.	Original Date	Latest Rev. Date	Title
14482-1	1-8-64	7-27-65	Foundation and Floor Plan and Details
14482-2	1-8-64	3-17-65	Foundation and Slab Details
20712-16	5-15-68	12-21-70	Plot and Drainage Plan
15501-040-M	7-20-83	7-20-90	Utility Layout
28540-004	6-29-84	6-5-86	Site Plan - Drainage - Addition
28540-008	6-29-84	N/R	Foundation Plan - Addition
28540-010	6-29-84	6-5-86	Foundation Sections and Details

Building No. 331

Drawing No.	Original Date	Latest Rev. Date	Title
RF-31-F1-C	8-30-51	2-25-53	Ground Floor and Foundation Plan
RF-31-S2-C	9-27-51	2-25-53	Footings and Details
15972-3	6-21-67	3-5-69	Addition - Foundation and Second Floor Framing Plans
15501-028-M	7-20-83	7-20-90	Site Utility Plans

TABLE 7-12
Industrial Area IM/IRA/DD
Foundation Drains and Foundation Drawings Cross Reference

Building No. 371/374

Drawing No.	Original Date	Latest Rev. Date	Title
25042-049	12-13-72	9-10-73	Subdrain Plan and Profile
25042-050	12-13-72	9-10-73	Subdrain Details
25032-023	5-23-73	2-3-76	Plutonium Recovery Plan Subdrains
25032-029	5-24-73	2-3-76	Subdrain and Earth Fill Sections
25032-030	5-23-73	2-3-76	Subdrain and Earth Fill Sections
25032-031	5-24-73	2-3-76	Subdrain and Earth Fill Sections
25032-032	5-18-73	1-5-76	Subdrain and Earth Fill Sections
25032-033	5-15-73	1-5-76	Subdrain and Earth Fill Sections and Details
25032-035	7-2-73	2-3-76	Waste Treatment Details
25025-015	3-4-76	N/R	Subbasement Floor Plan, Plumbing Drawing Index
25022-004	2-2-77	8-19-80	Area Plot Plan, Foundation and Storm Drains
15501-011-M	7-20-83	7-20-90	Site Utility Plans
15501-019-M	7-20-83	7-20-90	Site Utility Plans
37487-200	7-11-86	12-4-87	Cemented Salt Storage - Foundation Plan
30371-001-1E	7-4-87	12-11-90	Subbasement Floor Plan
30371-002-1H	7-27-87	8-7-90	Basement Floor Plan

Building No. 439

Drawing No.	Original Date	Latest Rev. Date	Title
21341-11	9-4-68	N/R	Foundation and Floor Slab Plan
21341-12	9-5-68	N/R	Foundation and Floor Slab Sections and Details
15501-052-M	7-20-83	7-20-90	Site Utility Plans

TABLE 7-12
Industrial Area IM/IRA/DD
Foundation Drains and Foundation Drawings Cross Reference

Building No. 440

Drawing No.	Original Date	Latest Rev. Date	Title
21341-01	8-22-68	N/R	Foundation and Floor Slab Plan
21341-02	9-4-68	N/R	Foundation Wall Elevations
21341-03	9-5-68	N/R	Foundation and Floor Slab Sections and Details
21341-04	9-18-68	N/R	Foundation Sections
21341-05	9-20-68	N/R	Miscellaneous Sections and Details
15501-051-M	7-20-83	7-20-90	Site Utility Plans
15501-052-M	7-20-83	7-20-90	Site Utility Plans

Building No. 441

Drawing No.	Original Date	Latest Rev. Date	Title
RF-41-F1-B	1-28-51	4-10-53	Foundation Plan and Details
RF-41-F2-B	1-28-51	4-10-53	Foundation Details and Sections
RF-41-Y1-B	2-10-52	4-10-53	Plot Plan
21641-31	8-18-69	10-28-71	Addition and Renovation Foundation Plan
21641-32	8-18-69	10-28-71	Addition and Renovation Foundation Sections and Details
15501-040-M	7-20-83	7-20-90	Utility Layout

Building No. 442

Drawing No.	Original Date	Latest Rev. Date	Title
RF-42-F1-B	1-11-52	3-5-53	Columns and Foundation Plan
RF-42-Y1-B	2-8-52	3-5-53	Plot Plan
15501-041-M	7-20-83	7-20-90	Site Utility Plans
26693-005	5-15-84	11-14-85	HEPA Building Plan and Foundation

TABLE 7-12
Industrial Area IM/IRA/DD
Foundation Drains and Foundation Drawings Cross Reference

Building No. 444

Drawing No.	Original Date	Latest Rev. Date	Title
RF-44-F1	3-7-52	N/L	Foundation Plans and Details
(13608-44)*		3-3-53	Foundation Plans and Details
RF-44-F2	3-7-52	3-3-53	Foundation Schedule and Details
RF-44-F3	3-7-52	3-3-53	Foundation Details
RF-44-Y1	3-7-52	N/L	Plot Plan
RF-44-109-F	5-28-52	N/L	Sump Pumps - Details and Sections
RF-44-126-G	9-?-52	7-22-53	Process and Service Piping - Rooms 1 & 2
RF-44-127	1-18-52	N/L	Process Waste Details - Basement Level
RF-44-127-E	9-7-52	4-?-53	Process and Service Piping
(1-6540-44)*			Process and Serving Piping
1-3184-44	7-11-55	N/R	Process Waste and Filtration System
25581-4	6-13-75	12-9-75	Foundation Drain Plan
15501-052-M	7-20-83	7-20-90	Site Utility Plans
15501-041-M	7-20-85	7-20-90	Site Utility Plans
RF-44-107*			Process Waste Details, Basement Bldg. 444

Building No. 447

Drawing No.	Original Date	Latest Rev. Date	Title
RF-47-F1	6-1-55	N/L	Foundation and Mezzanine Plans and Details
1-3326-47	6-1-55	6-26-64	Floor Trenches and Underground Piping
15501-052-M	7-20-83	7-20-90	Site Utility Plans

TABLE 7-12
Industrial Area IM/IRA/DD
Foundation Drains and Foundation Drawings Cross Reference

Building No. 460

Drawing No.	Original Date	Latest Rev. Date	Title
36001-304	4-22-83	7-22-83	Foundation Layout
36001-305	4-28-83	7-22-83	Foundations, Sections
15501-040-M	7-20-83	7-20-90	Area Layout
15501-051-M	7-20-83	7-20-90	Site Utility Plans
28646-3	10-14-83	10-21-83	Area Utilities Location
36010-100	11-18-83	10-9-84	Storm Drain Layout
36010-300	10-30-83	1-12-84	Foundation Layout
36010-301	10-28-83	1-12-84	Foundation Layout (continued)
36010-302	10-28-83	1-12-84	Foundation Schedule and Details
36010-304	12-1-83	1-12-84	Vault Plans
36010-452	3-23-84	3-5-85	Underground Piping
36010-453	3-23-84	3-5-85	Mechanical Piping
36010-459	3-23-84	3-5-85	Mechanical Piping

Building No. 559

Drawing No.	Original Date	Latest Rev. Date	Title
RF-AY-14027-3	8-17-65	5-8-68	Site Details - Sheet No. 1
RF-AY-14027-6	8-17-65	5-8-68	Site Details - Sheet No. 4
RF-AY-14028-1	8-17-65	5-8-68	Foundation Plan
RF-AY-14028-3	8-17-65	5-8-68	Foundation and Roof Details
RF-AY-14028-4	8-17-65	5-8-68	Tunnel Plan and Details
RF-AY-14028-7	8-17-65	5-8-68	Schedules
21412-01	12-?-68	10-4-71	Plot and Drainage Plan
15501-020-M	7-20-83	7-20-90	Site Utility Plans
23452-102*		1-5-73	
23452-203*		9-?-74	

TABLE 7-12
Industrial Area IM/IRA/DD
Foundation Drains and Foundation Drawings Cross Reference

Building No. 701

Drawing No.	Original Date	Latest Rev. Date	Title
17940-1	3-13-68	6-26-69	Maintenance Shops - Plan and Details
17940-3	4-4-68	6-26-69	Maintenance Shops - Miscellaneous Details
15501-013-M	7-20-83	7-20-90	Site Utility Plans

Building No. 707

Drawing No.	Original Date	Latest Rev. Date	Title
20220-06	3-21-67	8-4-71	Utility Plans
20220-08	9-21-67	2-19-75	Utility Plans
20220-12	9-21-67	1-5-75	Utility Plans
RF-BZ-20451-05	2-16-68	11-4-70	Plumbing Plan - Underground - Part A
RF-BZ-20451-06	2-19-68	11-4-70	Plumbing Plan - Underground - Part B
RF-BZ-20451-07	2-23-68	11-4-70	Plumbing Plan - Underground - Part C
RF-BZ-20451-08	2-13-68	11-4-70	Plumbing Plan - Underground - Part D
RF-BZ-20451-09	3-15-68	11-4-70	Plumbing Plan Details
15501-021-M	7-20-83	5-14-90	Site Utility Plans
15501-030-M	7-20-83	7-20-90	Site Utility Plans
15501-030-01L	12-20-89	N/R	Shelters for Pondcrete/Saltcrete T904A Trailer Site Plan

Building No. 731

Drawing No.	Original Date	Latest Rev. Date	Title
50095-101	2-19-92	3-3-92	Details Building 731 Waste Pit

Building No. 770

Drawing No.	Original Date	Latest Rev. Date	Title
13554-1	10-9-64	12-7-64	Modifications to Building Structural Details

TABLE 7-12
Industrial Area IM/IRA/DD
Foundation Drains and Foundation Drawings Cross Reference

Building No. 771

Drawing No.	Original Date	Latest Rev. Date	Title
7387-2	12-10-51	5-12-70	Underground Plumbing
RF-71-103	12-10-51	N/L	Southwest Area First Floor Underground Plumbing
RF-71-104-G	12-19-51	5-11-53	Southeast Area First Floor Underground Plumbing
RF-71-F1	N/L	5-11-53	Foundation Plan
RF-71-S7	1-17-52	5-11-53	Foundation Plan Details
RF-71-101	1-14-52	11-6-65	Northwest Area First Floor Underground Plumbing
RF-71-102-E	1-14-52	5-11-53	Northeast Area First Floor Underground Plumbing
RF-71-113-D	2-8-52	5-11-53	Sewer and Drainage Lines
2-4185	3-31-59	N/R	Underground Utilities Layout - Zones G-6, G-7, H-6, and H-7
RF-V71-10008	8-6-62	N/R	Foundation Plan Sections and Details - Addition
15754-1	11-15-66	6-25-69	West Dock Extension - Foundation Plan and Details
19604-1	11-8-70	2-5-72	Floor Plan
RF-71-111-C	3-12-75	5-11-53	Sanitary, Process, and Storm Drains - Profiles
25581-5	6-13-75	12-9-75	Foundation Drain Plan
15501-012-M	7-20-83	11-20-90	Site Utility Plans
15501-013-M	7-20-83	7-20-90	Site Utility Plans
RF-71-100*		5-11-53	Underground Plumbing Plans
RF-71-116-C*			Arrangement of Holding Tanks

FINAL

TABLE 7-12
Industrial Area IM/IRA/DD
Foundation Drains and Foundation Drawings Cross Reference

Building No. 774

Drawing No.	Original Date	Latest Rev. Date	Title
RF-74-1-G	5-29-52	11-?-53	Plans and Elevations
RF-74-S1-D	6-6-52	11-?-53	Foundation - Floor-Roof Plan - Beam and Girder Details
2-4185	3-31-59	N/R	Underground Utilities Layout - Zones G-6, G-7, H-6, and H-7
RF-V74-10012	8-6-62	N/R	Bldg. 774 Addition - Foundation Plan
14773-2	12-3-65	3-15-67	Waste Disposal Facility Plot Plan
23542-103	3-29-72	9-?-74	Excavation and Grading Plan
23542-202	1-28-72	5-24-72	Grading and Utility Plan
25581-6	6-13-75	12-9-75	Foundation Drain Plan, Bldg. 774
15501-013-M	7-20-83	7-20-90	Site Utility Plans
37728-002	9-17-86	3-9-90	Waste Treatment Addition - Bldg. 774
37728-014	9-17-86	3-4-90	Waste Treatment Addition Foundation and Wall Sections
29655-470	10-30-89	5-11-90	Bldg. 774 Subgrade Drain Pump Casing Details
38544-X10*			Utility Demolition Plan

Building No. 776

Drawing No.	Original Date	Latest Rev. Date	Title
1-13324	12-2-55	6-4-66	Foundation Plan
RF-76-17202	12-9-55	9-19-57	Footing Schedule and Details
12571-2	1-19-56	3-18-70	Basement Plan and Sections
15232-1	4-9-64	4-2-66	Additions and Alterations Foundation Plan
15232-2	4-15-64	N/R	Additions and Alterations Foundation Sect. and Details
15501-013-M	7-20-83	7-20-90	Site Utility Plans
15501-021-M	7-20-83	5-14-90	Site Utility Plans
2545-1*			

TABLE 7-12
Industrial Area IM/IRA/DD
Foundation Drains and Foundation Drawings Cross Reference

Building No. 777			
Drawing No.	**Original Date**	**Latest Rev. Date**	**Title**
1-11142-77	12-30-55	7-16-63	Miscellaneous Foundation Details - Sheet 1
1-11143-77	1-3-56	N/L	Miscellaneous Foundation Details - Sheet 2
RF-77-17305-4	2-20-56	3-10-62	Concrete First Floor Plan
RF-AP-77-B1	7-9-64	5-27-65	East Addition Foundation and First Floor Plan
(14504-1)	7-9-64	5-27-65	East Addition Foundation and First Floor Plan
RF-AP-77-B4	7-9-64	4-27-65	Foundation and Floor Plan Sections, Remodel and Addition
(14505-1)	7-9-64	4-29-65	Foundation and Floor Plan Sections, Remodel and Addition
15501-013-M	7-20-83	7-20-90	Site Utility Plans
15501-021-M	7-20-83	5-14-65	Site Utility Plans

Building No. 778			
Drawing No.	**Original Date**	**Latest Rev. Date**	**Title**
11324-8	12-15-61	N/R	Office and Cafeteria Building - Foundation Plan
11324-9	12-15-61	N/R	Office and Cafeteria Building - Foundation Plan (cont.)
14991-1	4-23-64	4-15-65	Addition - Site Plan, Foundation Plan and Details
15501-021-M	7-20-83	5-14-90	Site Utility Plans
2545-1*			

TABLE 7-12
Industrial Area IM/IRA/DD
Foundation Drains and Foundation Drawings Cross Reference

Building No. 779

Drawing No.	Original Date	Latest Rev. Date	Title
14607-2	N/L	12-14-64	Foundation and First Floor Plan
14608-1	N/L	12-14-64	Column and Footing Schedules
14608-2	N/L	12-14-64	Basement Slabs, Sections and Details
20112-01	6-19-67	9-12-68	Grading and Drainage Plan - Addition
20142-01	6-19-67	9-12-68	Foundation and First Floor Plan - Addition
20143-01	6-13-67	9-12-68	Footing Schedule and Details
20143-02	6-19-67	9-12-68	Foundation Details - Addition
20143-03	6-19-67	9-12-68	Foundation Details - Addition
25581-7	6-13-75	12-9-75	Foundation Drain Plan
15501-021-M	7-20-83	5-14-90	Site Utility Plans
15501-013-M	7-20-83	7-20-90	Site Utility Plans
20112-04*			Grading and Drainage Plan

Building No. 850

Drawing No.	Original Date	Latest Rev. Date	Title
28234-103	2-15-82	12-16-85	Site Plan
28234-106	2-15-82	12-16-85	First Floor Plan
28234-309	3-20-82	12-16-85	Plumbing Site Plan
15501-053-M	7-20-83	7-20-90	Site Utility Plans

TABLE 7-12
Industrial Area IM/IRA/DD
Foundation Drains and Foundation Drawings Cross Reference

FINAL

Building No. 865

Drawing No.	Original Date	Latest Rev. Date	Title
21112-01	8-?-68	6-12-72	Plot and Drainage Plan
21112-02	8-?-68	6-12-72	Plot and Drainage Plan
21112-03	8-?-68	6-12-72	Plot and Drainage Plan
21141-01	6-21-68	6-15-72	Cast-in-Place Pile Plan
21141-03	8-1-68	6-15-72	Foundation and Floor Slab Plan - Part A
21141-04	8-1-68	8-2-72	Foundation and Floor Slab Plan - Part B
21141-05	8-2-68	6-15-72	Foundation and Floor Slab Plan - Part C
21141-06	8-2-68	6-15-72	Foundation and Floor Slab Plan - Part D
21141-07	8-2-68	6-15-72	Foundation and Floor Slab Plan - Part E
21141-08	8-3-68	6-15-72	Foundation and Floor Slab Plan - Part F
21143-07-A	11-2-68	6-14-72	Process Waste Pit Plan and Sections
21151-03-C	11-22-68	9-11-75	Office Above Ground Plumbing Plan
21151-04-A	11-22-68	6-14-72	General Shop Area Underground Plan
21151-05-B	2-28-69	7-10-72	General Shop Area Above Ground Plumbing Plan
15501-043-M	7-20-83	7-20-90	Site Utility Plans

TABLE 7-12
Industrial Area IM/IRA/DD
Foundation Drains and Foundation Drawings Cross Reference

FINAL

Building No. 881

Drawing No.	Original Date	Latest Rev. Date	Title
RF-81-Y2-B	12-14-51	7-23-53	Excavation Plan
1-11609-81	1-24-52	5-23-63	Plot Plan
RF-81-F1	1-24-52	10-8-53	Foundation Plan, Bldg. 881
RF-81-F2-C	1-24-52	7-23-53	Foundation Schedule and Details
RF-81-100	3-12-52	7-23-53	Storm and Sanitary Drains
RF-81-F7-K	4-4-52	7-23-53	Foundation Details, Bldg. 881
RF-81-109-B	5-16-52	7-23-53	Mezzanine Equipment Drains and Water Supply
RF-FS-21951*	3-9-56		Foundation Drain Lines for 883 and 881
25581-2	6-13-75	12-9-75	Foundation Drain Plan
15501-054-M	7-20-83	7-20-90	Site Utility Plans
38548-128	1-18-91	1-18-91	Collection Gallery and Pipeline Location Plan
38548-137	1-14-91	1-18-91	Civil Details
50026-100	10-28-91	N/L	Drainage Ditch Improvements

Building No. 883

Drawing No.	Original Date	Latest Rev. Date	Title
1-5373-83	12-9-55	1-20-65	Foundation Plan
~~RF-FS-21951~~	~~3-9-56~~	~~N/R~~	Foundation Drain Lines for 883 and 881
1-5162-83	5-28-58	6-5-58	Foundations Floor Plan and Details - Addition
1-5169-83	5-22-58	6-5-58	Electric, Sprinklers, Lightning Prot. and Details - Addition
RF-14250-2	8-10-65	6-30-67	Area Drainage Plan
20612-41-A	11-?-68	10-19-71	Plot and Drainage Plan
25581-9	6-13-75	12-9-75	Foundation Drain Plan
15501-043-M	7-20-83	7-20-90	Site Utility Plans
28483-204	11-21-83	4-6-86	Foundation Sections - Addition
28483-022	7-6-84	2-6-86	Sump Discharge Line

TABLE 7-12
Industrial Area IM/IRA/DD
Foundation Drains and Foundation Drawings Cross Reference

FINAL

Building No. 886

Drawing No.	Original Date	Latest Rev. Date	Title
14825-4	11-12-63	5-19-63	Miscellaneous Sections and Details
14825-1	3-12-64	5-19-65	Foundation Plan and Sections
17242	9-27-65	N/R	Sump Pump Installation
18497-2	1-17-68	3-5-69	Foundation Plan and Details
23482-302	8-28-72	3-?-75	Grading Plan
23482-304	8-28-72	3-?-75	Drainage Plan and Details
25925-1	7-15-77	8-30-77	Subsurface Drainage Control (Underground Drains)
25925-2	7-15-77	8-30-77	Subsurface Drainage Control (Profile and Sections)
25925-3	5-11-77	8-30-77	Subsurface Drainage Control (Grading and Drainage Plan)
25925-X01	8-2-77	8-30-77	Subsurface Drainage Control (Title Sheet)
25925-X02	8-2-77	8-30-77	Subsurface Drainage Control (Area Plot Plan)
15501-043-M	7-20-83	7-20-90	Site Utility Plans
15501-044-M	7-20-83	7-20-90	Site Utility Plans

Building No. 887

Drawing No.	Original Date	Latest Rev. Date	Title
RF-81-F9-E	5-29-52	7-?-78	Foundation Plan - Sections and Details Bldg. 881
RF-81-F10-G	5-29-52	7-?-79	Sections and Details Bldg. 881
15501-054-M	7-20-83	7-20-90	Site Utility Plans
50026-100	10-28-91	N/L	Drainage Ditch Improvements
50498-401	11-25-92	3-31-93	Sewage Life Pump Piping Plans and Details

Building No. 889

Drawing No.	Original Date	Latest Rev. Date	Title
RF-BP-14286-2	5-7-66	9-15-67	Foundation and Framing Plans

TABLE 7-12
Industrial Area IM/IRA/DD
Foundation Drains and Foundation Drawings Cross Reference

FINAL

Building No. 910

Drawing No.	Original Date	Latest Rev. Date	Title
15501-022-M	7-20-83	7-20-90	Site Utility Plans
39365-X011	5-15-93	5-20-93	Basement Floor Piping Plan Demolition

Building No. 991

Drawing No.	Original Date	Latest Rev. Date	Title
1-3354-91	7-31-51	8-29-52	Plumbing and Service Pipeline - Utility Tunnel Plan
RF-91-F1-C	7-27-51	9-24-51	Footing and Foundation Plan
RF-91-F2-C	7-23-51	N/L	Column and Footing Schedule and Details
RF-91-S9-C	8-8-51	9-24-51	Wall Sections
15708-1	8-15-51	2-24-67	Plot Plan
1-7084-91A	6-15-59	7-10-59	Access Door Details
RF-BY-15928-2-B	8-21-67	3-6-68	Grading and Location Plan
15928-8-B	10-31-67	3-6-68	Repave Dock Area, Bldg. 991 Subdrainage System
25581-10	6-13-75	12-9-75	Foundation Drain Plan
15501-023-M	7-20-83	6-14-90	Site Utility Plans
15501-032-M	7-20-83	7-20-90	Site Utility Plans

Building No. 995

Drawing No.	Original Date	Latest Rev. Date	Title
20741-30	6-21-68	9-2-70	Sludge Drying Bed Plan and Sections
20741-31	5-17-68	9-2-70	Sewage Plant Addition Clarifier and Digester Plans
20741-32	5-17-68	9-2-70	Sewage Plant Addition Sections
20741-33	8-29-68	9-2-70	Sewage Plant Addition - Sections and Details
20712-61	7-?-68	9-11-70	Plot and Grading
20722-61	9-?-68	9-2-70	Piping Plan
15501-024-M	7-20-83	6-14-90	Site Utility Plans
38922-101	10-19-89	10-25-89	Foundation Plan

TABLE 7-12
Industrial Area IM/IRA/DD
Foundation Drains and Foundation Drawings Cross Reference

Building No. 996/997/999

Drawing No.	Original Date	Latest Rev. Date	Title
RF-99-17701	1-13-56	6-6-56	Concrete - Plans and Sections
RF-99-17702	1-13-56	6-6-56	Concrete - Sections and Details
13812-1	N/R	3-11-68	Floor Plan - Floor Slab - Roof Slab and Wall Sections
13812-3	N/R	3-11-68	Tunnel Plan - Elevations and Sections Bldg. 996 and 997
13812-5	N/R	3-11-68	Floor Plan - Sections Bldg. 996 and 997
25581-12	6-13-75	12-9-75	Foundation Drain Plan
15501-022-M	7-20-83	7-20-90	Site Utility Plans
15501-023-M	7-20-83	6-14-90	Site Utility Plans

Building No. 998

Drawing No.	Original Date	Latest Rev. Date	Title
RF-98-A1	7-30-51	9-28-52	Plan and Details
RF-98-S2	9-13-51	9-28-52	Concrete Tunnel Details to Bldg. 998
15708-1	8-15-51	2-24-67	Plot Plan
25581-11	6-13-75	12-9-75	Foundation Drain Plan
15501-023-M	7-20-83	6-14-90	Site Utility Plans

Miscellaneous Drawings

Drawing No.	Original Date	Latest Rev. Date	Title
25581-1	12-9-75	12-9-75	Foundation Drain Plan - Drain Terminating Points
27550-002	8-25-80	5-4-82	Perimeter Security Zone
27550-024	9-18-80	5-6-82	Perimeter Security Zone
27550-033	9-18-80	4-30-82	Perimeter Security Zone
27550-040	9-18-80	5-10-82	Perimeter Security Zone
27550-050	8-25-80	5-10-82	Perimeter Security Zone
27550-098	8-25-80	5-10-82	Perimeter Security Zone
27550-112	9-18-80	5-11-82	Perimeter Security Zone

Source: Operable Unit 8, Draft Technical Memorandum Number 1 (EG&G 1994)
Notes: N/R = Not Recorded N/L = Not Legible * = No Drawings Found

7.8 REFERENCES

Conroy, Bartley. 1989 (August). "Design and Engineering of the UMTRA Mobile Waste Treatment Plant." Paper presented at the annual meeting of AIChE, Philadelphia. August 20 to 23, 1989.

EG&G Rocky Flats, Inc. 1994 (April). *Technical Memorandum Number 1, Data Compilation, Operable Unit 8, 700 Area.* Two Volumes. Draft. Prepared by Jacobs Engineering Group Inc.

EG&G Rocky Flats, Inc. 1993a (September). *Control and Disposition of Incidental Waters.*

EG&G Rocky Flats, Inc. 1993b (November 10). Bill Hayes, EG&G Surface Water Division. Telephone conversation with T.C. Wait of Jacobs Engineering Group Inc. concerning incidental waters and sampling procedures.

EG&G Rocky Flats, Inc. 1993c (April). *Non-Storm Water Discharge Locations and Sampling at Rocky Flats.*

EG&G Rocky Flats, Inc. 1993d (December 6). Frank Gibbs, EG&G Building 559/560 manager. Field conversation with Mike Visocky, David Landes, T.C. Wait, and Theresa Jehn-Dellaport of Jacobs Engineering Group Inc. concerning Building 559 foundation drain and "green hose."

EG&G Rocky Flats, Inc. 1993e (December 2). Mark Burmeister, EG&G OU1 Treatment Facility. Telephone conversation with T.C. Wait of Jacobs Engineering Group Inc. about Building 881 foundation drains.

EG&G Rocky Flats, Inc. 1993f (December 19). Leslie Dunstan, EG&G Surface Water Division. Office visit with David Landes and Mike Visocky of Jacobs Engineering Group Inc. concerning the RFP foundation drains.

EG&G Rocky Flats, Inc. 1993g (December 12). Leslie Dunstan, EG&G Surface Water Division. Telephone conversation with David Landes of Jacobs Engineering Group Inc. concerning the sampling program for foundation drains and building sumps.

EG&G Rocky Flats, Inc. 1993h (December 2). Russ Cirillo, EG&G OU1 Treatment Facility. Telephone conversation with T.C. Wait of Jacobs Engineering Group Inc. concerning 881 foundation drain flow data.

EG&G Rocky Flats, Inc. 1993i. Ron Henry, Surface Water Division. Incidental Water Logs, 1990 to 1993.

EG&G Rocky Flats, Inc. 1993j (June 1). Dean Yashan, EG&G Surface Water Division. Memorandum to Bob Stevens concerning the proposed response to the May 13, 1993 "Management of Foundation Drain and Utility Pit Water" letter from M.S. Karol to T.G. Hedahl.

EG&G Rocky Flats, Inc. 1993k (October 21). Mark Burmeister and R. Cirillo, EG&G OU1 Treatment Facility. Field site visit and conversation with T.C. Wait of Jacobs Engineering Group Inc. regarding OU1 treatment facility.

EG&G Rocky Flats, Inc. 1993l (November 16). Craig Cowdry, EG&G OU2 Treatment Facility. Telephone conversation with T.C. Wait of Jacobs Engineering Group Inc. about the primary treatment facilities at Rocky Flats.

EG&G Rocky Flats, Inc. 1993m (November 19). Frank Huffman, EG&G Wastewater Treatment Plant Shift Manager. Site visit and conversation with David Landes of Jacobs Engineering Group Inc. about the wastewater treatment plant (Building 995).

EG&G Rocky Flats, Inc. 1993n (December 9). Georgene Porter, EG&G Authorized Classifier. Telephone conversation and office meeting with Farrel Hobbs of Jacobs Engineering Group Inc. concerning the classification of Building 460 outfall and wastewater treatment plant detectors.

EG&G Rocky Flats, Inc. 1993o. *Storm Water NPDES Permit - Application Monitoring Program, Rocky Flats Plant Site.*

EG&G Rocky Flats, Inc. 1993p (December 1). Rick Wagner, EG&G Building 774 manager. Telephone conversation with Mike Visocky of Jacobs Engineering Group Inc. concerning Building 774 foundation drains, tanks, and sumps.

EG&G Rocky Flats, Inc. 1993q (January). *Operational Safety Analysis (OSA) for Building 910 Evaporators.*

EG&G Rocky Flats Inc. 1993r (November 16). Carrie Wesley. EG&G Building 374 Assistant Manager. Telephone conversation with T.C. White of Jacobs Engineering Group Inc. regarding Building 374 evaporation.

EG&G Rocky Flats, Inc. 1993s (November 4). Cat Butz, EG&G Surface Water Division. Office visit with T.C. Wait of Jacobs Engineering Group Inc. concerning the drain identification study and dye testing.

EG&G Rocky Flats, Inc. 1993t (March). *Final Phase Work Plan for OU9.*

EG&G Rocky Flats, Inc. 1992a. *Surface Water Management Plan*. Draft. Prepared by Wright Water Engineers.

EG&G Rocky Flats, Inc. 1992b (December 22). A.L. Schubert, EG&G Waste Programs. Memorandum written to R.V. Morgan of EG&G Waste Operations concerning specific organic guidelines for the Building 374 evaporators.

EG&G Rocky Flats, Inc. 1992c (December). *Operational Safety Analysis (OSA) for Building 374 Evaporators*.

EG&G Rocky Flats, Inc. 1992d. *Rocky Flats Plant Mission Transition Program Management Plan*.

EG&G Rocky Flats, Inc. 1992e (April). *Proposed IM/IRA/DD for the Solar Evaporation Ponds - OU4*.

EG&G Rocky Flats, Inc. 1992f (November). *A Description of Rocky Flats Foundation Drains*. EG&G Rocky Flats, Golden, Colorado.

EG&G Rocky Flats, Inc. 1991a (May). *Sampling and Analysis Plan, Surface Water IM/IRA, South Walnut Creek Basin OU2, Granular Activated Carbon Treatment System*.

EG&G Rocky Flats, Inc. 1991b (November). *Catalogue of Monitoring Activities*.

EG&G Rocky Flats, Inc. 1991c (August). *Work Plan for Field Treatability Study, South Walnut Creek Basin Surface Water IM/IRA*.

EG&G Rocky Flats, Inc.. 1991d (September). *Sanitary Sewer Infiltration/Inflow and Exfiltration Study: RFP: Task 1 of the Zero-Offsite Water-Discharge Study*.

EG&G Rocky Flats, Inc.. 1991e (September). *Non-Point Source Assessment and Storm-Sewer Infiltration/Inflow and Exfiltration Study: RFP: Tasks 2 & 3 of the Zero-Offsite Water-Discharge Study.*

EG&G Rocky Flats, Inc.. 1991f (January). *Solar Ponds Interceptor Trench System: Groundwater Management Study, RFP: Task 7 of the Zero-Offsite Water-Discharge Study.*

EG&G Rocky Flats, Inc.. 1991g (January). *Sanitary Treatment Plant Evaluation Study: RFP: Task 10 of the Zero-Offsite Water-Discharge Study.*

EG&G Rocky Flats, Inc.. 1991h (May). *Reverse Osmosis and Mechanical Evaporation Study: RFP: Task 12 of the Zero-Offsite Water-Discharge Study.*

EG&G Rocky Flats, Inc.. 1991i (May). *Surface Water Evaporation Study: RFP: Task 15 of the Zero-Offsite Water-Discharge Study.*

EG&G Rocky Flats, Inc.. 1991j (June). *Alternatives to Zero Discharge: RFP: Task 17 of the Zero-Offsite Water-Discharge Study.*

EG&G Rocky Flats, Inc.. 1991k (June). *Report on Drain Investigations: RFP: Task 18 of the Zero-Offsite Water-Discharge Study.*

EG&G Rocky Flats, Inc.. 1991l (March). *Raw, Domestic and Industrial Water Pipeline Leak-Detection Method Study: Task 20 of the Zero-Offsite Water-Discharge Study.*

EG&G Rocky Flats, Inc.. 1991m (February). *Temporary Water Storage Capabilities Study: Task 21 of the Zero-Offsite Water-Discharge Study.*

EG&G Rocky Flats, Inc.. 1991n (May). *Feasibility of Groundwater Cutoff/Diversion Study: Task 26 of the Zero-Offsite Water-Discharge Study.*

EG&G Rocky Flats, Inc. 1990 (November). *Evaluation of Treatment Alternatives for Storm Water in Ponds A-4, B-5, and C-2: Final Report.*

EG&G Rocky Flats, Inc. 1988 (September). *Water Management Alternatives for the Rocky Flats Plant.*

Hedahl, T.G. 1994 (July 8). Letter from T.G. Hedahl, Director of Waste Management to Mark N. Silverman, Manager DOE Rocky Flats Field Office.

Hoffman, Nancy D. 1981 (December 17). *Water Quality Data for Foundation Drains and Building Sumps from 1977 through 1981.* Draft.

Hurr, R.T. 1976 (March). *Hydrology of Nuclear-Processing Plant Site, Rocky Flats, Jefferson County, Colorado.* Open File Report 76-268. USGS, Denver, Colorado.

Keddy, Michael. 1989 (September). *Summary of Technologies for Remediation of Aquifers.* Los Alamos National Laboratories.

Los Alamos National Laboratory. 1992a (November). *Installation Work Plan for Environmental Restoration Clean-up Program.* Vol. 1.

Los Alamos National Laboratory. 1992b (November). *Installation Work Plan for Environmental Restoration Clean-up Program.* Vol. 2.

Los Alamos National Laboratory. 1986 (February). *Low-Level Integrated System Test.*

Morgan, R.E. 1990 (December). *Environmental Constituents in the Rocky Flats Area - Non-Facility Related Sources Pertinent to Water Quality.*

Nyhan, John. 1989 (February). *Analysis of Precipitation Occurrences in Los Alamos, New Mexico, for Long-Term Predictions of Waste Repository Behavior.* Los Alamos National Laboratory.

Rockwell International. 1987 (June). *Safety Analysis Report - Building 774.* Final.

U.S. Department of Energy. 1993 (February). *Annual Report for Treatability Studies at Rocky Flats Plant, Fiscal Year 1992.*

U.S. Department of Energy. 1992. *Annual Report for Treatability Studies at Rocky Flats Plant, Fiscal Year 1991*

U.S. Department of Energy. 1991 (May). *Engineering Evaluation/Cost Analysis for the Proposed Management of Contaminated Structures at the Weldon Spring Chemical Plant.* Oak Ridge Operations Office.

U.S. Environmental Protection Agency. 1993 (September). "Demonstration of the Colloid Polishing Filter Method." EPA Program Fact Sheet. Golden, Colorado.

U.S. Environmental Protection Agency. 1990 (September). *Ultrox International Ultraviolet Radiation/Oxidation Technology: Applications Analysis Report.* Cincinnati, Ohio.

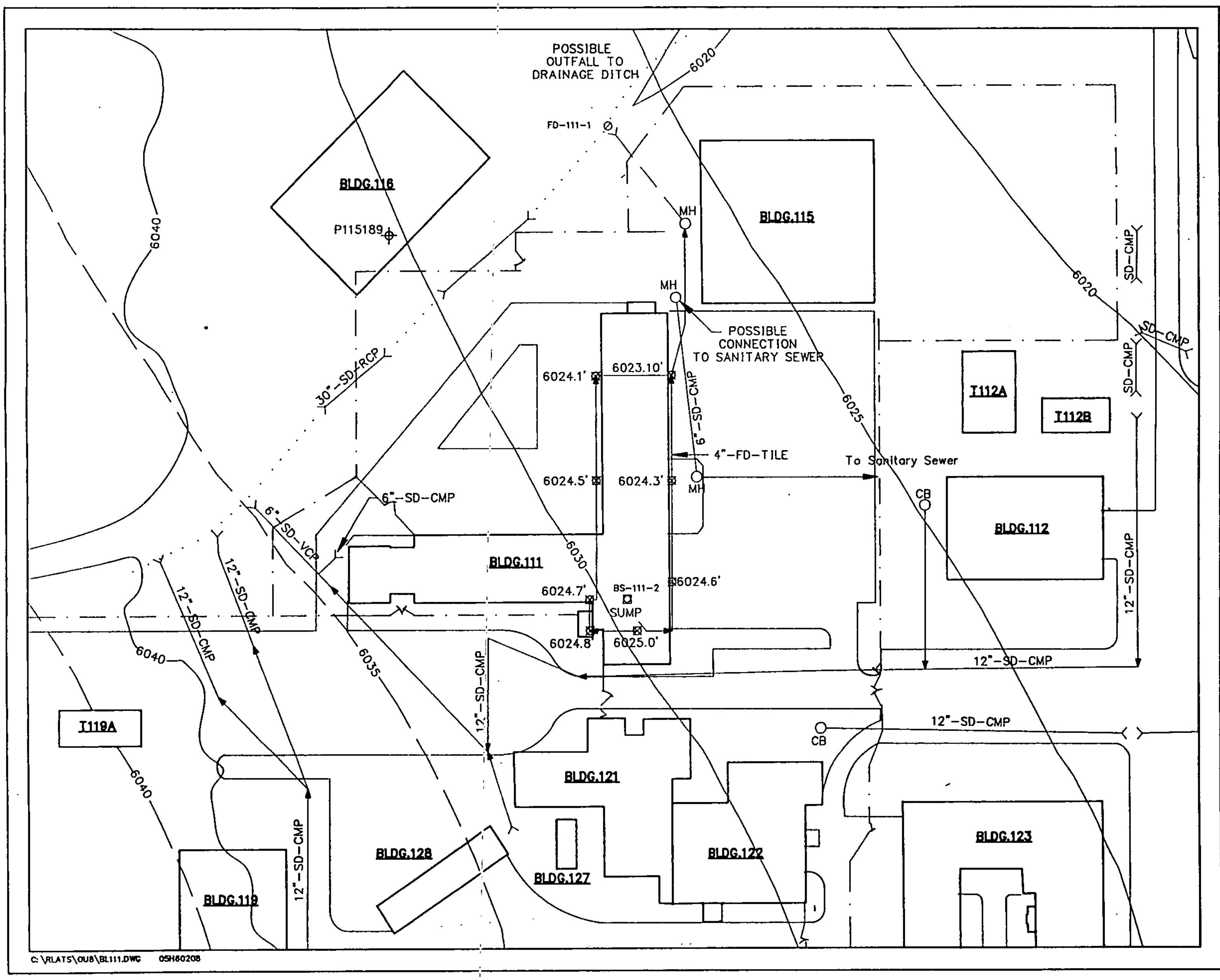
U.S. Environmental Protection Agency. 1989 (March). *Guide to Treatment Technologies for Hazardous Wastes at Superfund Sites.* Cincinnati, Ohio.

FINAL

APPENDIX 7.1

INDUSTRIAL AREA IM/IRA/DD

BUILDING FOUNDATION DRAINS AND PATHWAYS AT ROCKY FLATS PLANT INDUSTRIAL AREA



U.S. Department of Energy
Rocky Flats Plant

EXPLANATION

- Buildings
- Foundation Drain
- Storm Drain
- Suspected Storm Drain
- Sump
- FD Foundation Drain
- SD Storm Drain
- BS Building Sump
- VCP Vitrified Clay Pipe
- CMP Corrugated Metal Pipe
- RCP Reinforced Concrete Pipe
- CB Catch Basin
- MH Manhole
- Fences
- Roads
- Ditch
- Elevation Point
- Outfall
- Sample Station (Current)
- Sample Station (Historical)
- Sample Station (Proposed)
- Station Never Sampled
- Alluvial Monitoring Well
- 5960 Topographic Elevation
- 5950 Water Table Elevation Spring 1992

0 FEET 50 100 150

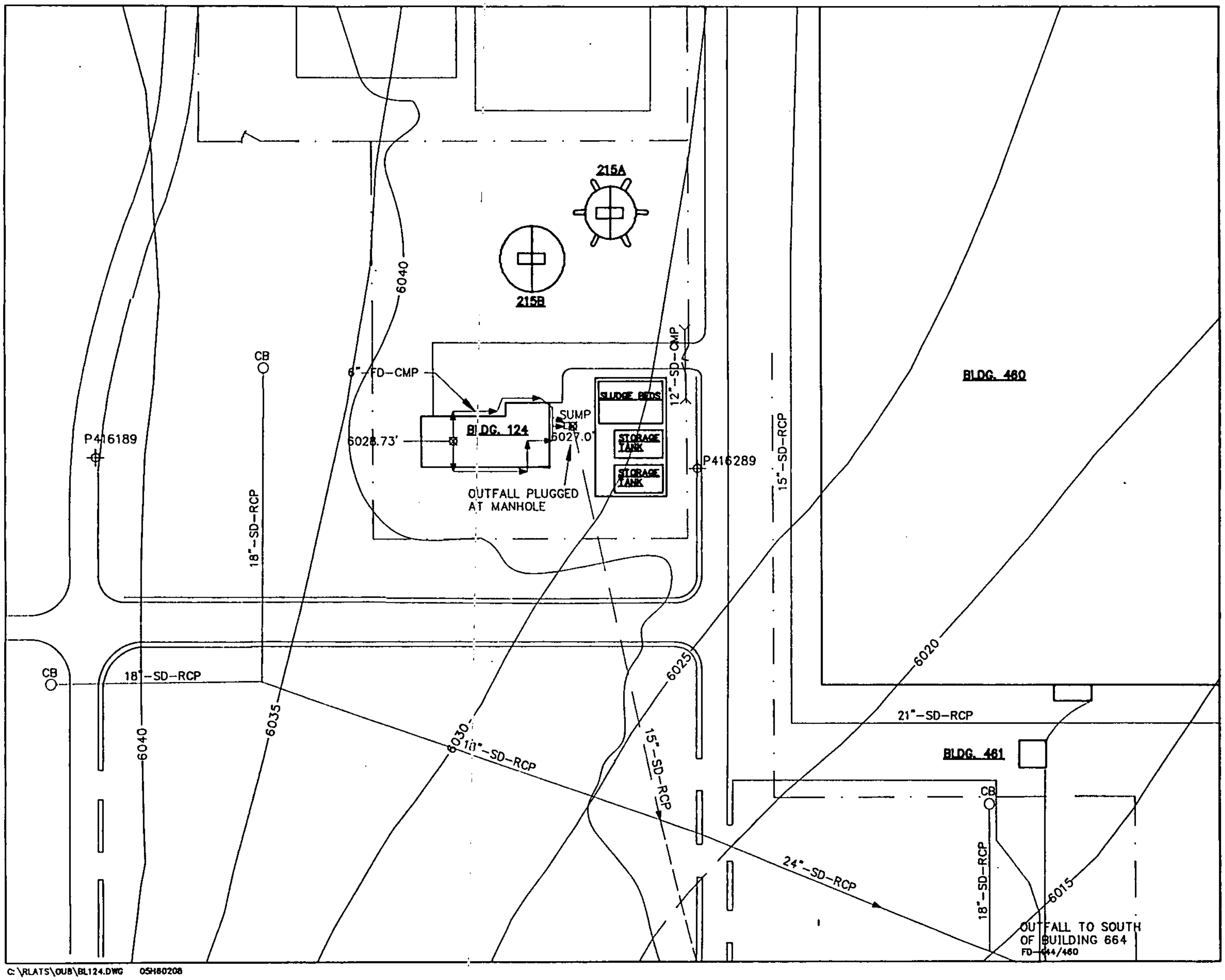
FIGURE A-1
INDUSTRIAL AREA IM/IRA/DD

Building 111
Foundation Drain Outfalls

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

U.S. Department of Energy
Rocky Flats Plant



EXPLANATION

Buildings
Foundation Drain
Storm Drain
Original Drain Location
Sump
FD Foundation Drain
SD Storm Drain
CMP Corrugated Metal Pipe
RCP Reinforced Concrete Pipe
CB Catch Basin
Fences
Roads
Elevation Point
Outfall
Sample Station (Current)
Sample Station (Historical)
Sample Station (Proposed)
Station Never Sampled
Alluvial Monitoring Well
Bedrock Monitoring Well
5960 Topographic Elevation
5950 Water Table Elevation Spring 1992

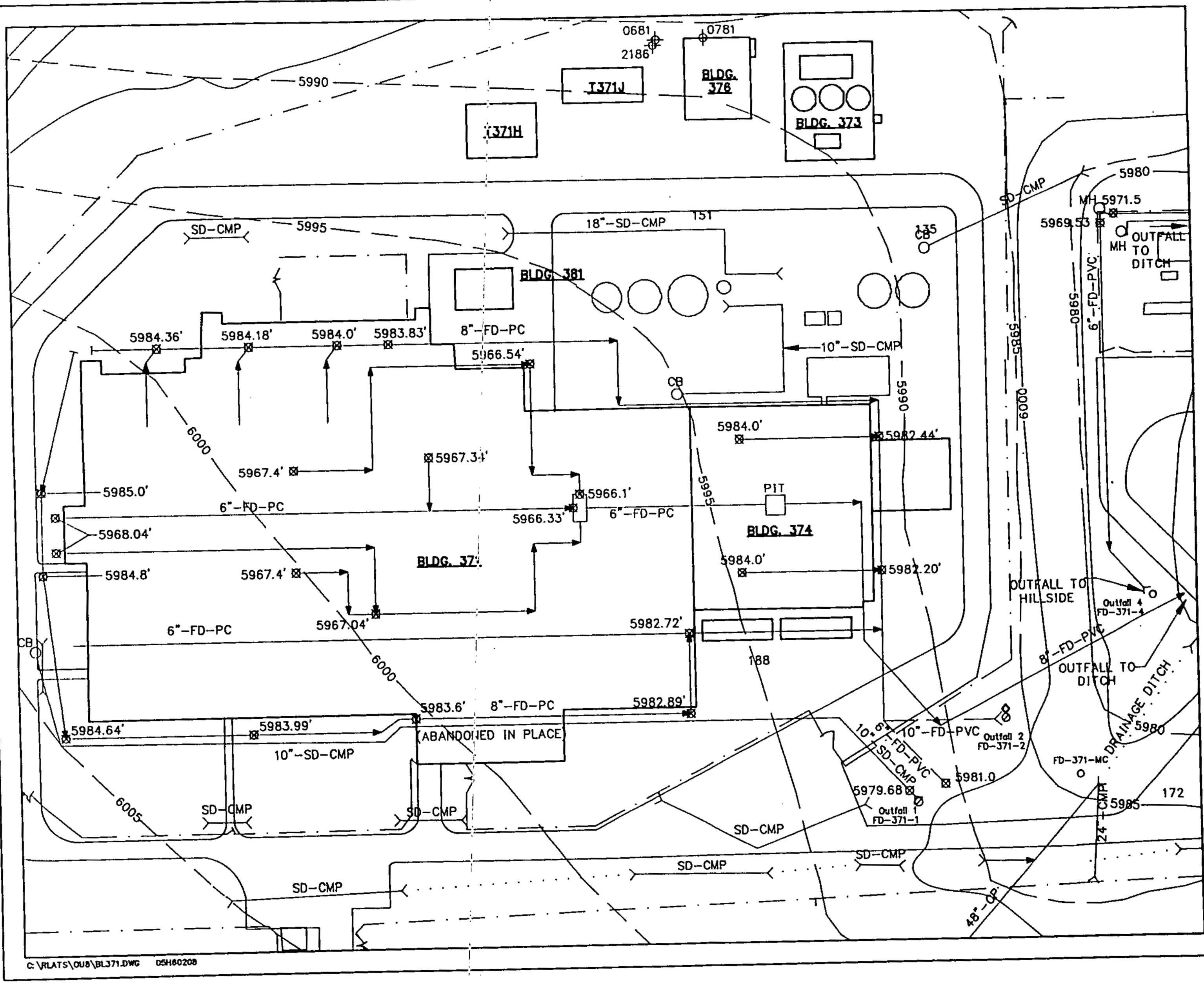
0 FEET 50 100 150

FIGURE A-2
INDUSTRIAL AREA IM/IRA/DD

Building 124
Foundation Drain Outfalls

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464



U.S. Department of Energy
Rocky Flats Plant

EXPLANATION

- Buildings
- Foundation Drain
- Storm Drain
- Possible Foundation Drain
- FD Foundation Drain
- SD Storm Drain
- CMP Corrugated Metal Pipe
- PVC PVC Pipe
- PC Porous Concrete
- CB Catch Basin
- MH Manhole
- Fences
- Roads
- Ditch
- Elevation Point
- Outfall
- Sample Station (Current)
- Sample Station (Historical)
- Sample Station (Proposed)
- Station Never Sampled
- Bedrock Monitoring Well
- 5960 Topographic Elevation
- 5950 Water Table Elevation Spring 1992

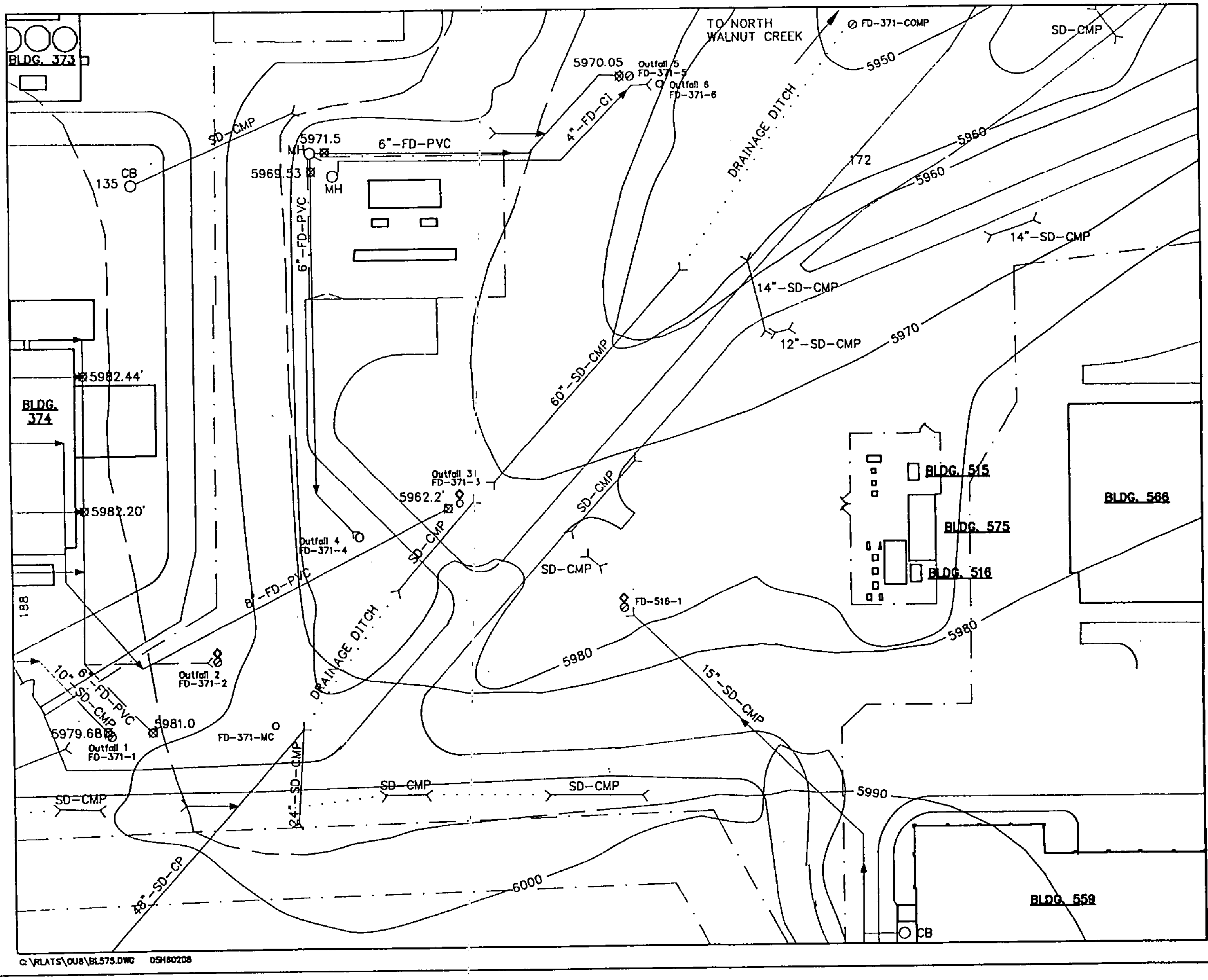
0 FEET 50 100 150

FIGURE A-3
INDUSTRIAL AREA IM/IRA/DD

Building 371
Foundation Drain Outfalls

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464



U.S. Department of Energy
Rocky Flats Plant

EXPLANATION

- Buildings
- Foundation Drain
- Storm Drain
- Possible Foundation Drain
- FD Foundation Drain
- SD Storm Drain
- CMP Corrugated Metal Pipe
- PVC PVC Pipe
- CI Cast Iron
- CP Concrete Pipe
- CB Catch Basin
- Fences
- Roads
- Ditch
- Elevation Point
- Outfall
- Sample Station (Current)
- Sample Station (Historical)
- Sample Station (Proposed)
- Station Never Sampled
- 5960 Topographic Elevation
- 5950 Water Table Elevation Spring 1992

0 FEET 50 100 150

FIGURE A-4
INDUSTRIAL AREA IM/IRA/DD

Buildings 559, 561, and 374
Foundation Drain Outfalls

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

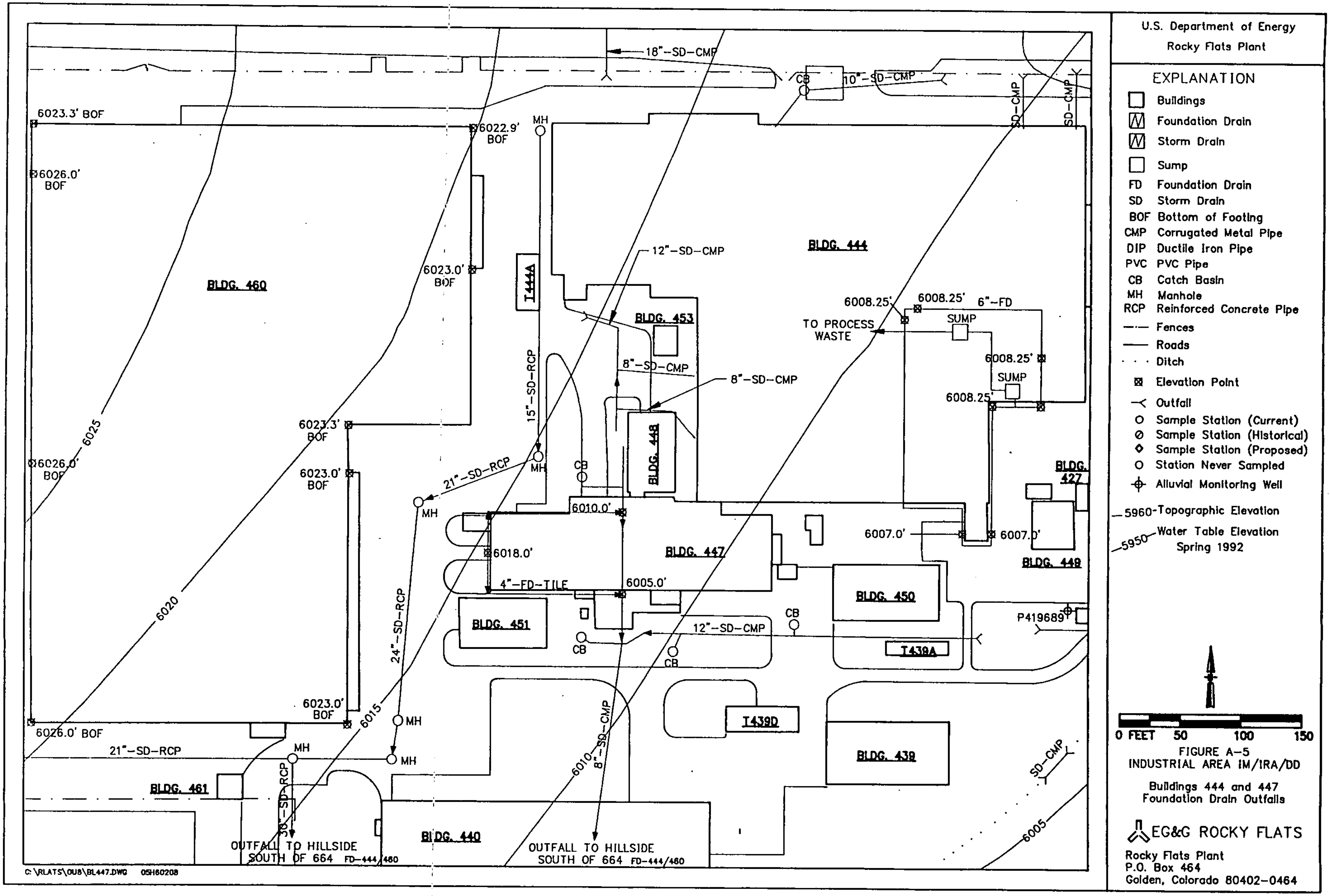
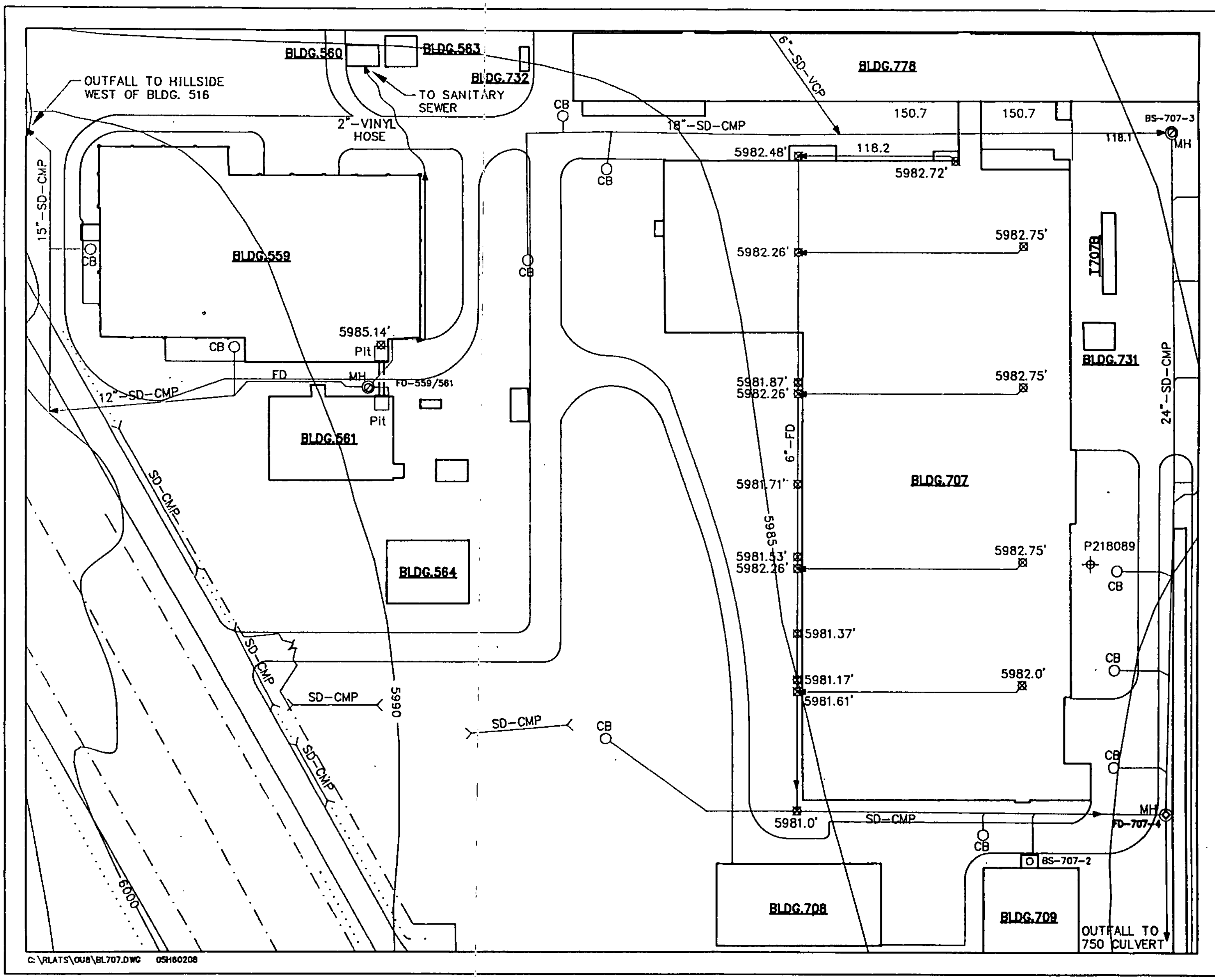


FIGURE A-5
INDUSTRIAL AREA IM/IRA/DD
Buildings 444 and 447 Foundation Drain Outfalls
EG&G ROCKY FLATS
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464



U.S. Department of Energy
Rocky Flats Plant

EXPLANATION

- Buildings
- Foundation Drain
- Storm Drain
- FD Foundation Drain
- SD Storm Drain
- BS Building Sump
- VCP Vitrified Clay Pipe
- CMP Corrugated Metal Pipe
- CB Catch Basin
- MH Manhole
- Fences
- Roads
- Tunnel
- Ditch
- Elevation Point
- Outfall
- Sample Station (Current)
- Sample Station (Historical)
- Sample Station (Proposed)
- Station Never Sampled
- Alluvial Monitoring Well
- 5960 Topographic Elevation
- 5950 Water Table Elevation Spring 1992

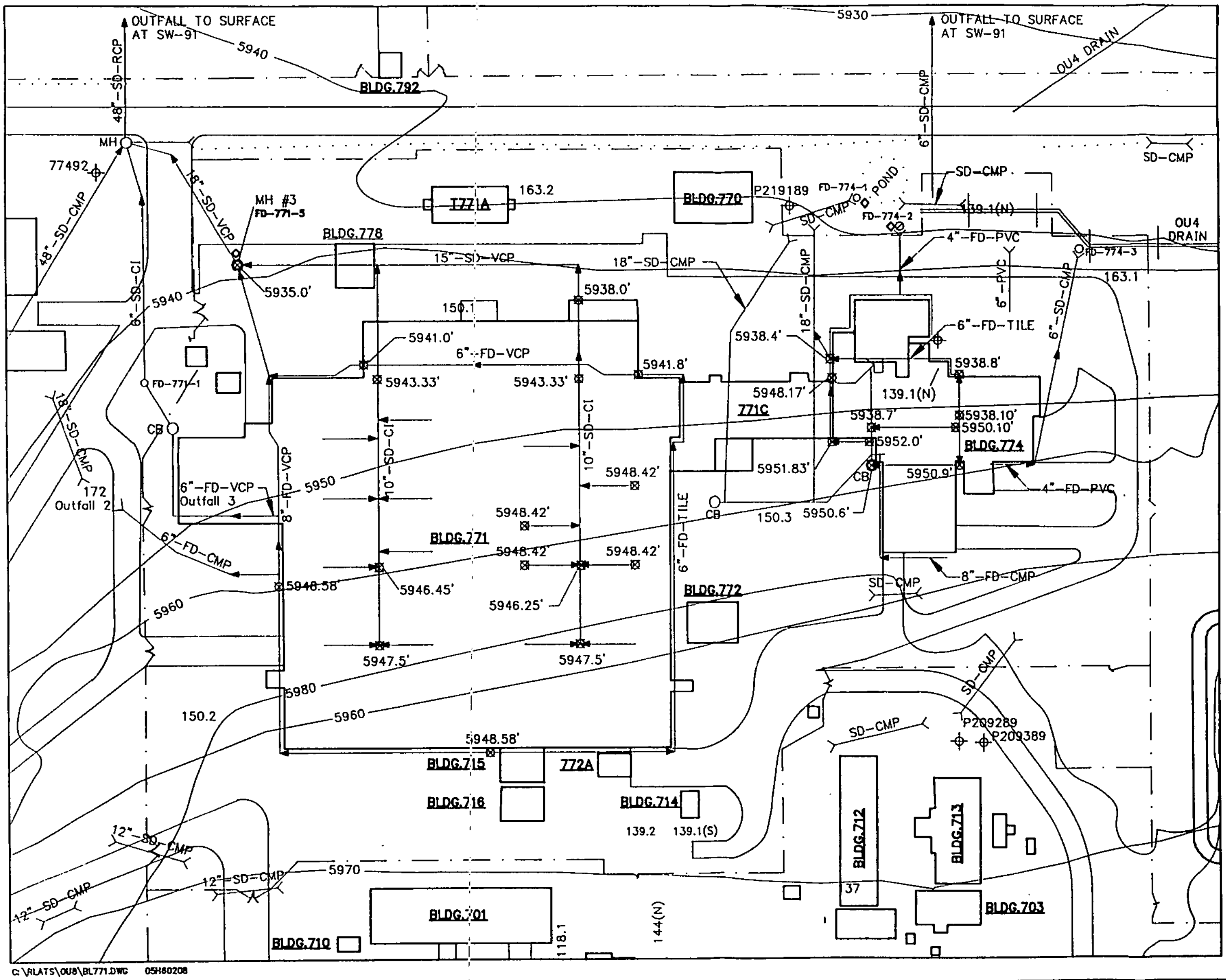
0 FEET 50 100 150

FIGURE A-6
INDUSTRIAL AREA IM/IRA/DD

Buildings 559, 561, and 707
Foundation Drain Outfalls

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464



U.S. Department of Energy
Rocky Flats Plant

EXPLANATION

- Buildings
- Foundation Drain
- Storm Drain
- OU4 Drain
- FD Foundation Drain
- SD Storm Drain
- VCP Vitrified Clay Pipe
- CMP Corrugated Metal Pipe
- PVC PVC Pipe
- RCP Reinforced Concrete Pipe
- SW Surface Water Sample Point
- CI Cast Iron
- CB Catch Basin
- MH Manhole
- Fences
- Roads
- Ditch
- Elevation Point
- Outfall
- Sample Station (Current)
- Sample Station (Historical)
- Sample Station (Proposed)
- Station Never Sampled
- Alluvial Monitoring Well
- Bedrock Monitoring Well
- 5960 Topographic Elevation
- 5950 Water Table Elevation Spring 1992

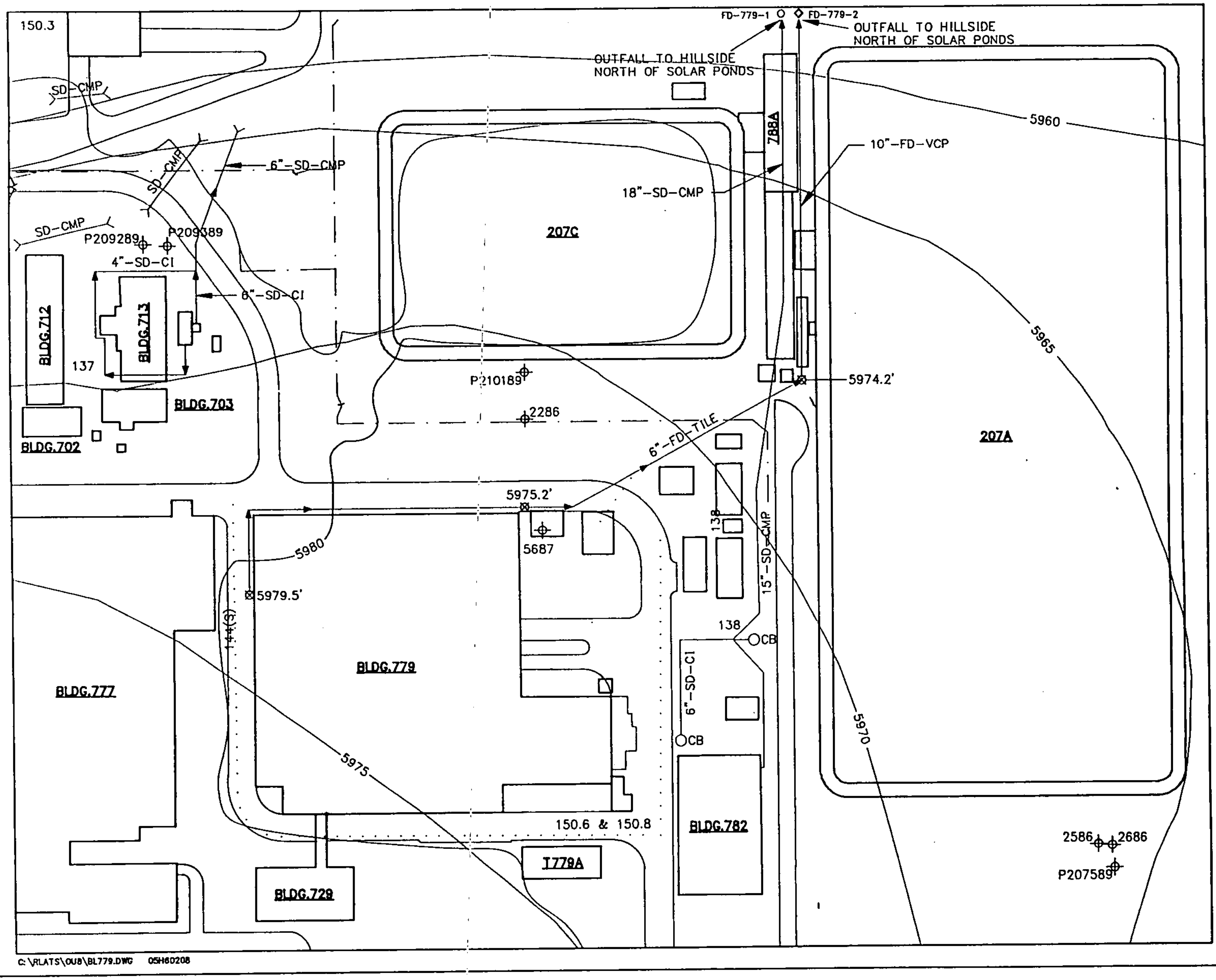
0 FEET 50 100 150

FIGURE A-7
INDUSTRIAL AREA IM/IRA/DD

Buildings 771 and 774
Foundation Drain Outfalls

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464



U.S. Department of Energy
Rocky Flats Plant

EXPLANATION

- Buildings
- Foundation Drain
- Storm Drain
- FD Foundation Drain
- SD Storm Drain
- VCP Vitrified Clay Pipe
- CMP Corrugated Metal Pipe
- CI Cast Iron
- CB Catch Basin
- Fences
- Roads
- Ditch
- Elevation Point
- Outfall
- Sample Station (Current)
- Sample Station (Historical)
- Sample Station (Proposed)
- Station Never Sampled
- Alluvial Monitoring Well
- Bedrock Monitoring Well
- 5960 Topographic Elevation
- 5950 Water Table Elevation Spring 1992

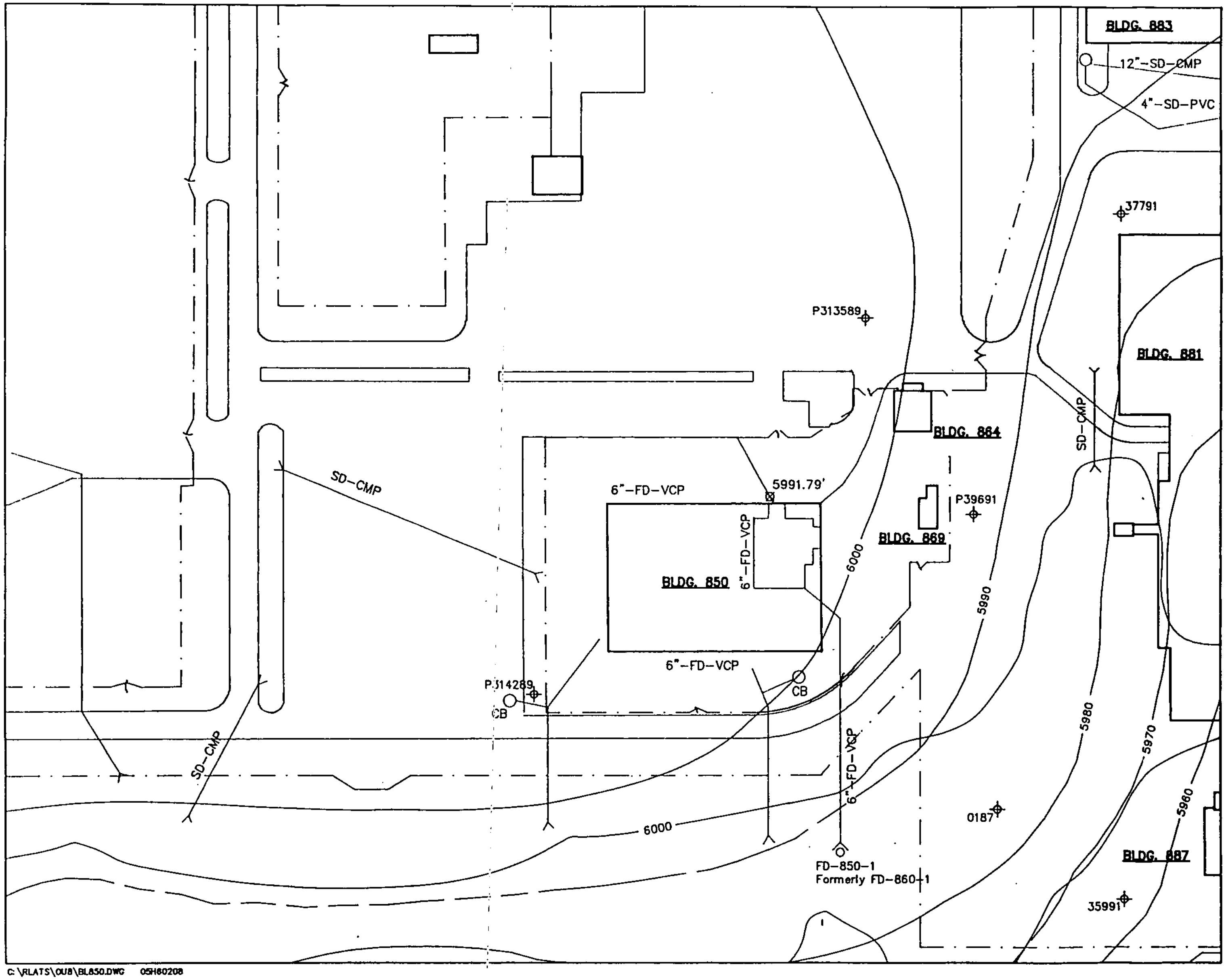
0 FEET 50 100 150

FIGURE A-8
INDUSTRIAL AREA IM/IRA/DD

Building 779
Foundation Drain Outfalls

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464



U.S. Department of Energy
Rocky Flats Plant

EXPLANATION

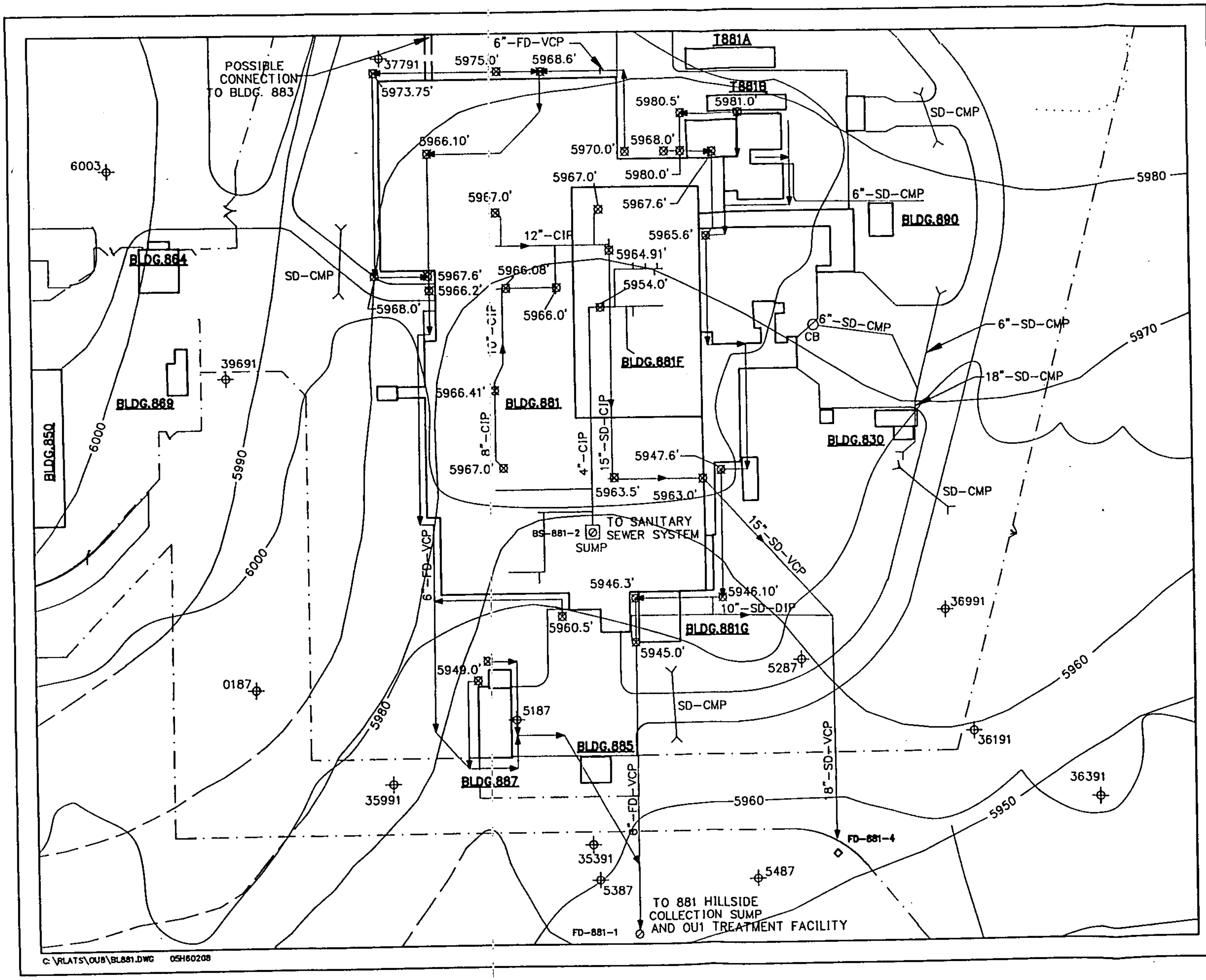
- Buildings
- Foundation Drain
- Storm Drain
- FD Foundation Drain
- SD Storm Drain
- VCP Vitrified Clay Pipe
- CMP Corrugated Metal Pipe
- PVC PVC Pipe
- CB Catch Basin
- Fences
- Roads
- Ditch
- Elevation Point
- Outfall
- Sample Station (Current)
- Sample Station (Historical)
- Sample Station (Proposed)
- Station Never Sampled
- Alluvial Monitoring Well
- Bedrock Monitoring Well
- 5960 Topographic Elevation
- 5950 Water Table Elevation Spring 1992

0 FEET 50 100 150

FIGURE A-9
INDUSTRIAL AREA IM/IRA/DD

Building 850
Foundation Drain Outfalls

EG&G ROCKY FLATS
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464



U.S. Department of Energy
Rocky Flats Plant

EXPLANATION

- Buildings
- Foundation Drain
- Storm Drain
- Utility Tunnel
- Sump
- FD Foundation Drain
- SD Storm Drain
- VCP Vitrified Clay Pipe
- CMP Corrugated Metal Pipe
- DIP Ductile Iron Pipe
- PVC PVC Pipe
- CIP Cast Iron Pipe
- Fences
- Roads
- Tunnel
- Ditch
- Elevation Point
- Outfall
- Sample Station (Current)
- Sample Station (Historical)
- Sample Station (Proposed)
- Station Never Sampled
- Alluvial Monitoring Well
- Bedrock Monitoring Well
- 5960 Topographic Elevation
- 5950 Water Table Elevation Spring 1992

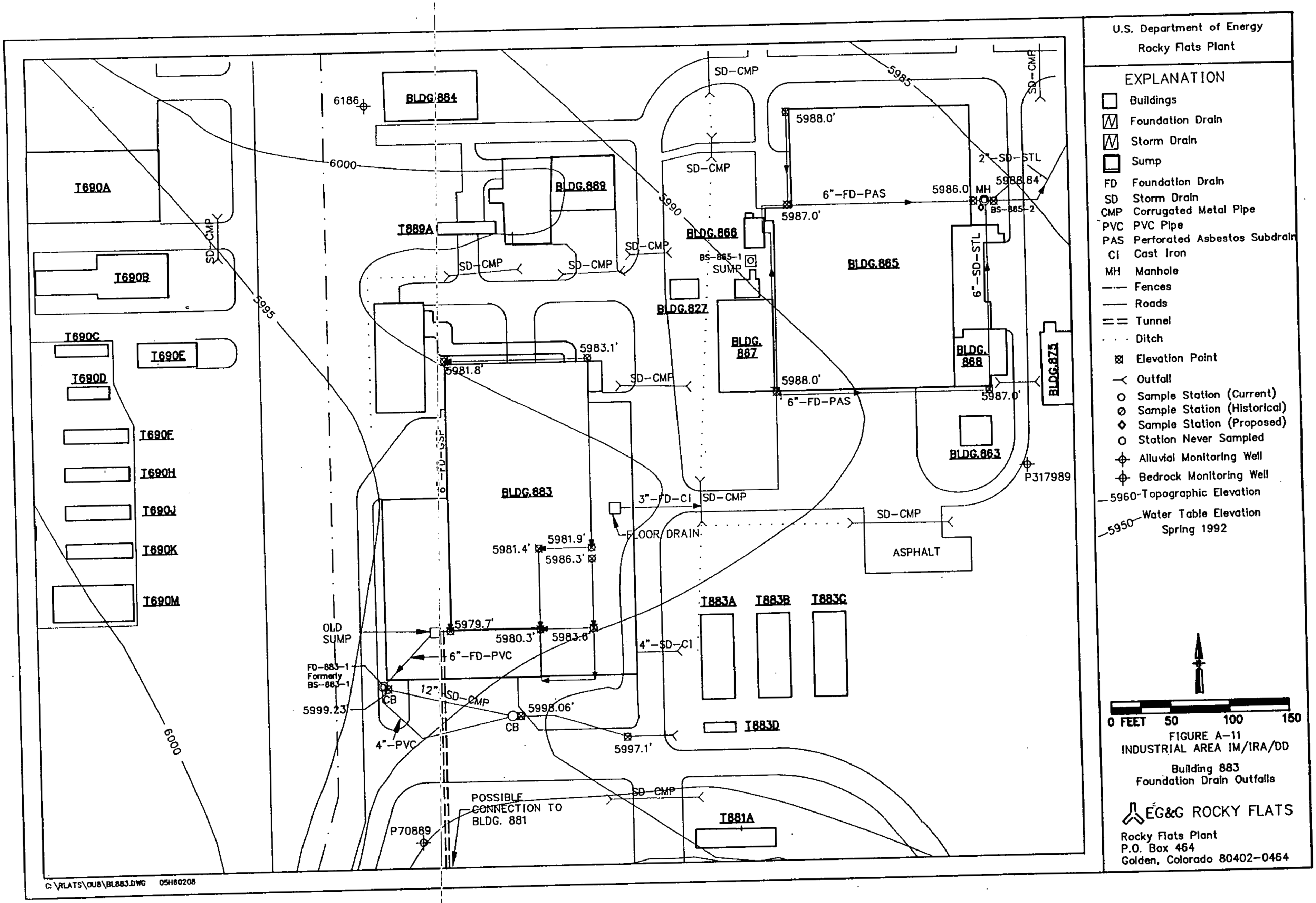
0 FEET 50 100 150

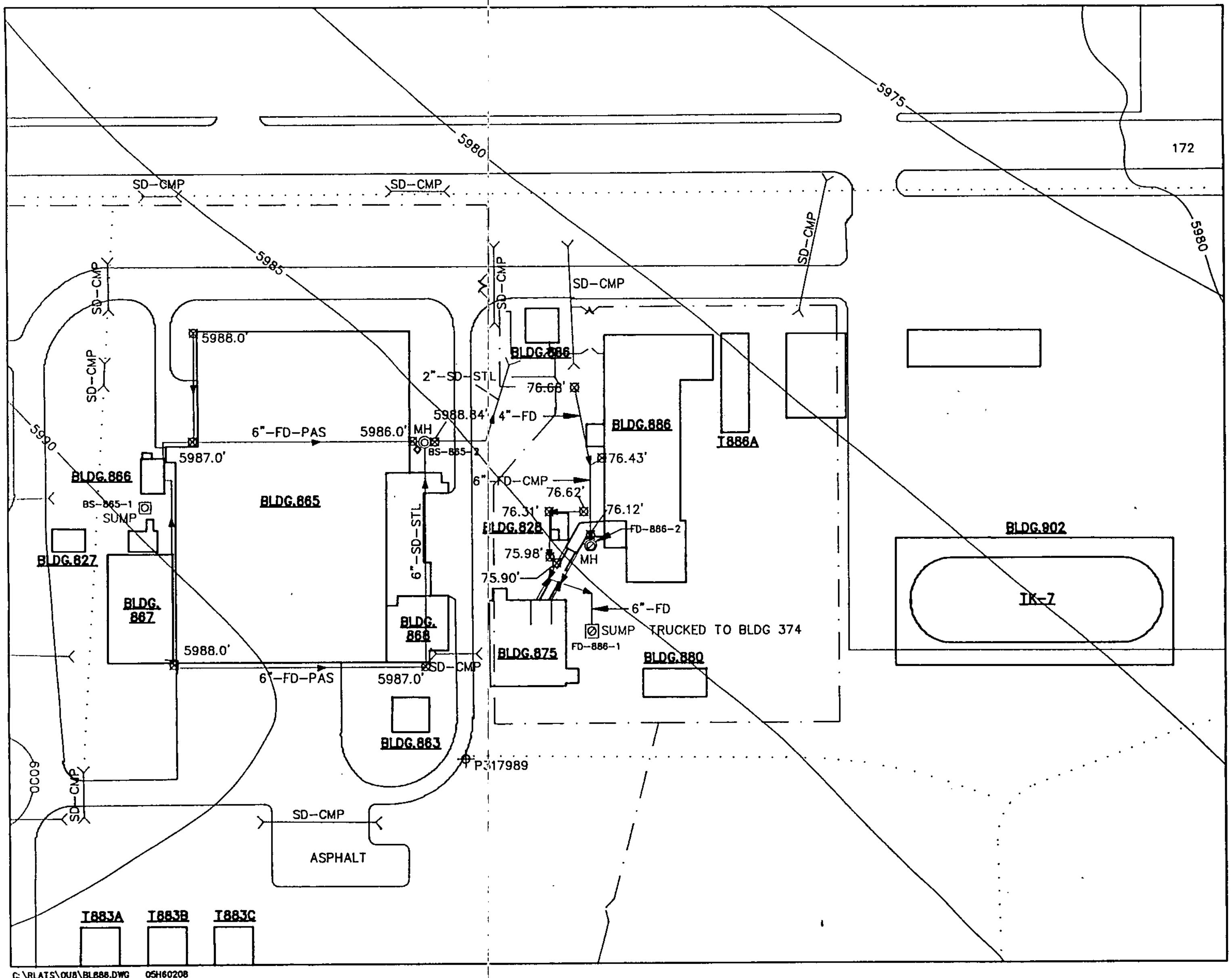
FIGURE A-10
INDUSTRIAL AREA IM/IRA/DD

Building 881
Foundation Drain Outfalls

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464


U.S. Department of Energy
Rocky Flats Plant
EXPLANATION
Buildings
Foundation Drain
Storm Drain
Sump
FD Foundation Drain
SD Storm Drain
CMP Corrugated Metal Pipe
PVC PVC Pipe
PAS Perforated Asbestos Subdrain
CI Cast Iron
MH Manhole
Fences
Roads
Tunnel
Ditch
Elevation Point
Outfall
Sample Station (Current)
Sample Station (Historical)
Sample Station (Proposed)
Station Never Sampled
Alluvial Monitoring Well
Bedrock Monitoring Well
5960 Topographic Elevation
5950 Water Table Elevation Spring 1992
0 FEET 50 100 150
FIGURE A-11
INDUSTRIAL AREA IM/IRA/DD
Building 883
Foundation Drain Outfalls
EG&G ROCKY FLATS
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464
BLDG 884
BLDG.889
BLDG.866
BLDG.865
BLDG.827
BLDG. 867
BLDG. 888
BLDG.875
BLDG.863
BLDG.883
T690A
T690B
T690C
T690D
T690E
T690F
T690H
T690J
T690K
T690M
T889A
T883A
T883B
T883C
T883D
T881A
ASPHALT
6186
6000
5995
5990
5985
SD-CMP
6"-FD-PAS
2"-SD-STL
6"-SD-STL
6"-FD-GSP
3"-FD-CI
4"-SD-CI
6"-FD-PVC
12" SD-CMP
4"-PVC
5988.0'
5986.0 MH
5988.84'
BS-865-2
5987.0'
BS-865-1 SUMP
5988.0'
5987.0'
5983.1'
5981.8'
5981.9'
5981.4'
5986.3'
5979.7'
5980.3'
5983.8'
FLOOR DRAIN
OLD SUMP
FD-883-1 Formerly BS-883-1
CB
5999.23'
5998.06'
5997.1'
P317989
POSSIBLE CONNECTION TO BLDG. 881
P70889
C:\RLATS\OU8\BL883.DWG 05H80208



U.S. Department of Energy
Rocky Flats Plant

EXPLANATION

- Buildings
- Foundation Drain
- Storm Drain
- Sump
- FD Foundation Drain
- SD Storm Drain
- BS Building Sump
- CMP Corrugated Metal Pipe
- STL Steel
- PAS Perforated Asbestos Subdrain
- MH Manhole
- Fences
- Tunnel
- Roads
- Ditch
- Elevation Point
- Outfall
- Sample Station (Current)
- Sample Station (Historical)
- Sample Station (Proposed)
- Station Never Sampled
- Alluvial Monitoring Well
- Bedrock Monitoring Well
- 5960 Topographic Elevation
- 5950 Water Table Elevation Spring 1992

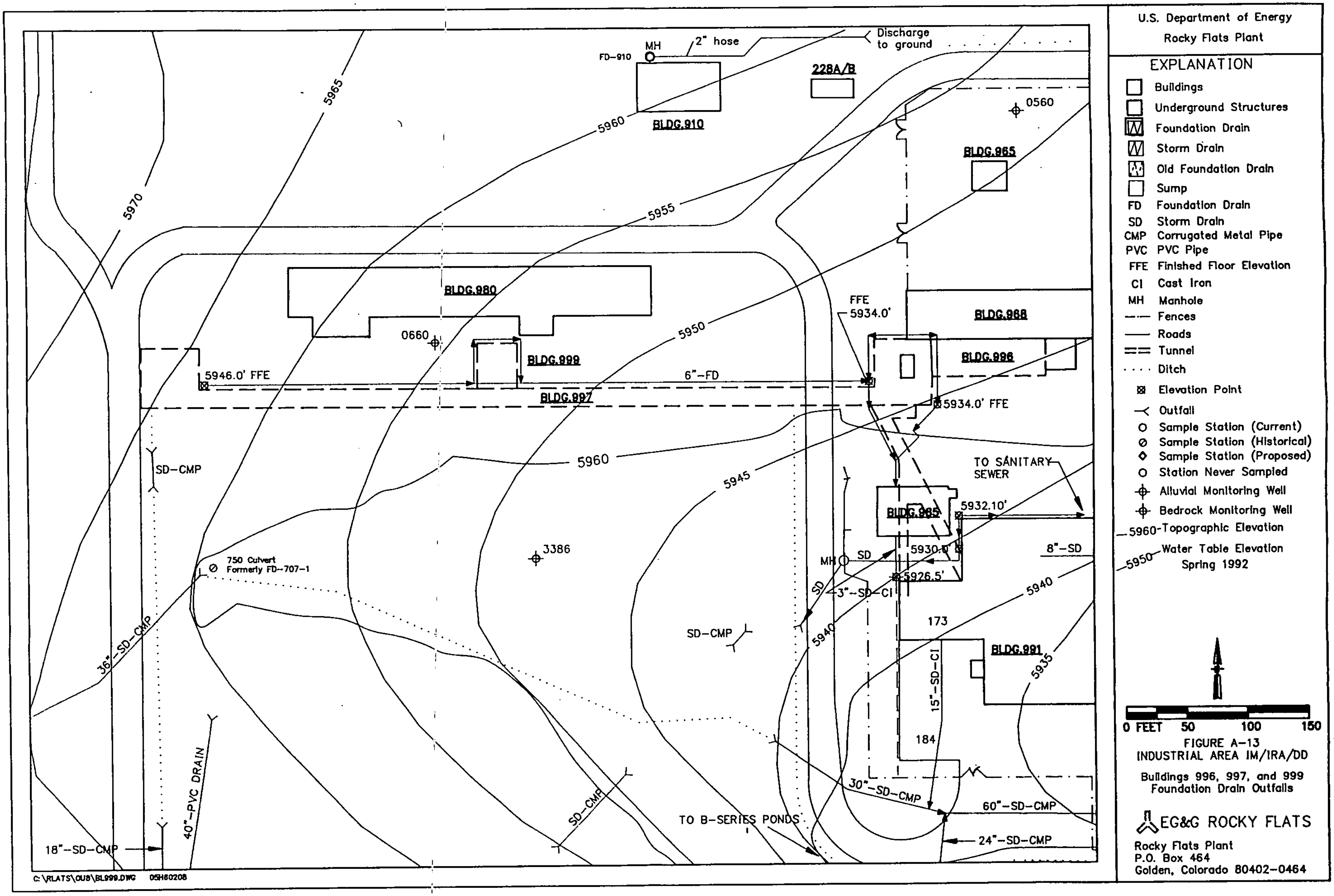
0 FEET 50 100 150

FIGURE A-12
INDUSTRIAL AREA IM/IRA/DD

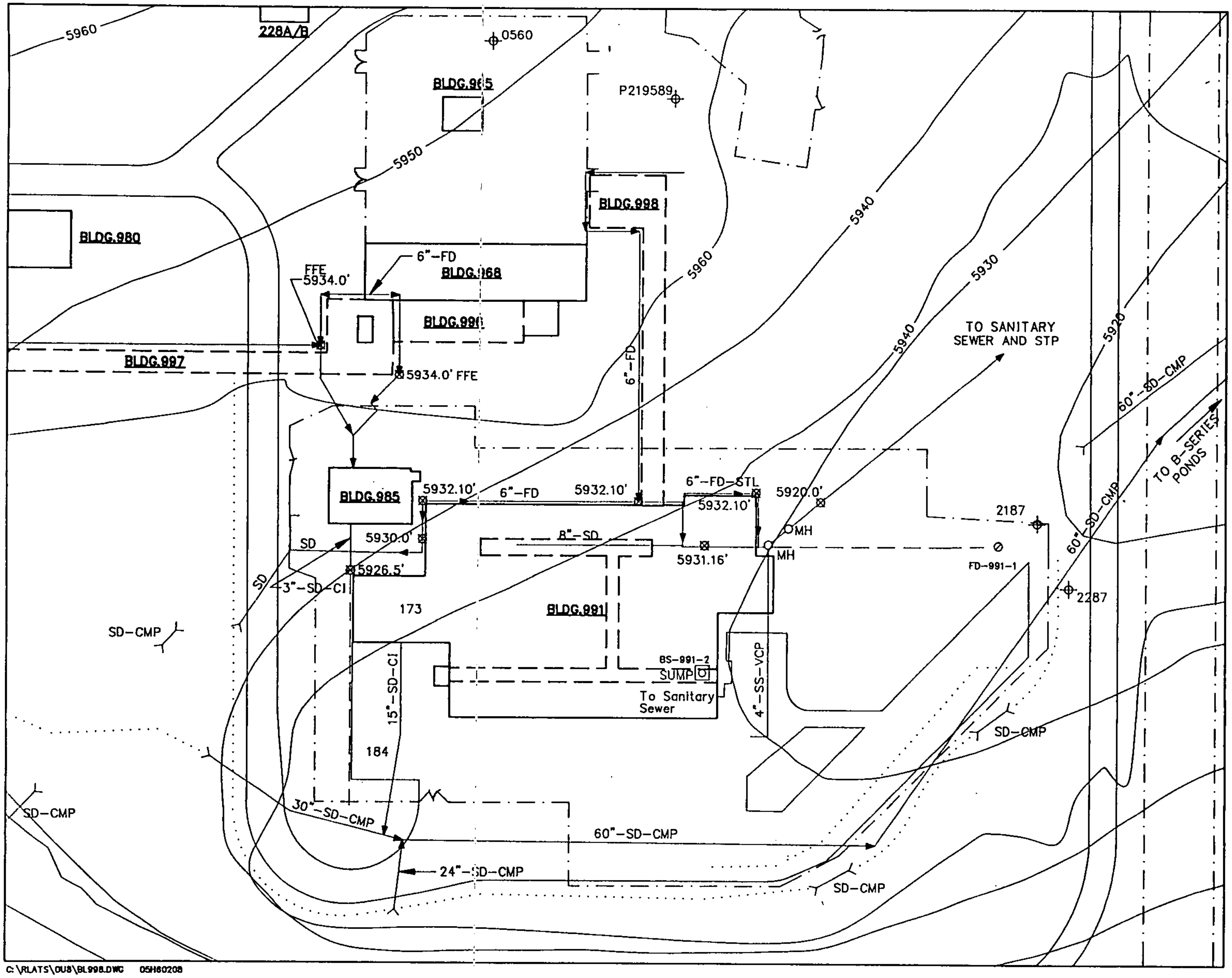
Buildings 865 and 886
Foundation Drain Outfalls

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464



U.S. Department of Energy
Rocky Flats Plant
EXPLANATION
Buildings
Underground Structures
Foundation Drain
Storm Drain
Old Foundation Drain
Sump
FD Foundation Drain
SD Storm Drain
CMP Corrugated Metal Pipe
PVC PVC Pipe
FFE Finished Floor Elevation
CI Cast Iron
MH Manhole
Fences
Roads
Tunnel
Ditch
Elevation Point
Outfall
Sample Station (Current)
Sample Station (Historical)
Sample Station (Proposed)
Station Never Sampled
Alluvial Monitoring Well
Bedrock Monitoring Well
5960 Topographic Elevation
5950 Water Table Elevation Spring 1992
0 FEET 50 100 150
FIGURE A-13
INDUSTRIAL AREA IM/IRA/DD
Buildings 996, 997, and 999 Foundation Drain Outfalls
EG&G ROCKY FLATS
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464
MH
FD-910
2" hose
Discharge to ground
228A/B
BLDG.910
0560
BLDG.965
BLDG.980
0660
BLDG.999
BLDG.997
5946.0' FFE
6"-FD
FFE 5934.0'
BLDG.968
BLDG.996
5934.0' FFE
SD-CMP
TO SANITARY SEWER
BLDG.985
5932.10'
5930.0'
5926.5'
8"-SD
MH
SD
3"-SD-CI
3386
750 Culvert Formerly FD-707-1
36"-SD-CMP
SD-CMP
173
BLDG.991
15"-SD-CI
184
30"-SD-CMP
60"-SD-CMP
24"-SD-CMP
TO B-SERIES PONDS
SD-CMP
40"-PVC DRAIN
18"-SD-CMP
5970
5965
5960
5955
5950
5945
5940
5935
C:\RLATS\OU8\BL999.DWG 05H60208



U.S. Department of Energy
Rocky Flats Plant

EXPLANATION

- Buildings
- Underground Structures
- Foundation Drain
- Storm Drain
- Old Foundation Drain
- Sump
- FD Foundation Drain
- SD Storm Drain
- VCP Vitrified Clay Pipe
- CMP Corrugated Metal Pipe
- PVC PVC Pipe
- CI Cast Iron
- STL Steel
- FFE Finished Floor Elevation
- MH Manhole
- Fences
- Roads
- Tunnel
- Ditch
- Elevation Point
- Outfall
- Sample Station (Current)
- Sample Station (Historical)
- Sample Station (Proposed)
- Station Never Sampled
- Alluvial Monitoring Well
- Bedrock Monitoring Well
- 5960 Topographic Elevation
- 5950 Water Table Elevation Spring 1992

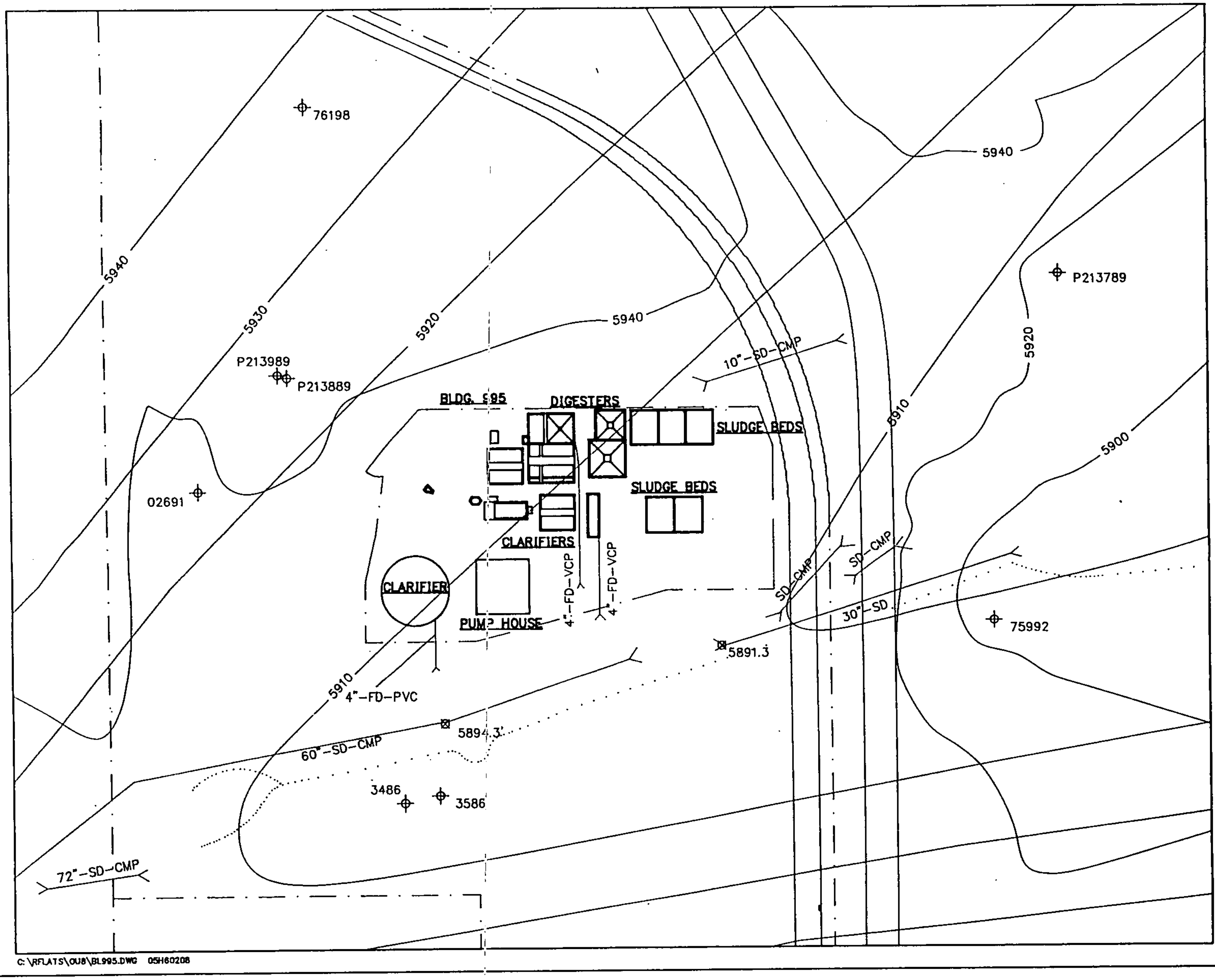
0 FEET 50 100 150

FIGURE A-14
INDUSTRIAL AREA IM/IRA/DD

Buildings 991 and 998
Foundation Drain Outfalls

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464



U.S. Department of Energy
Rocky Flats Plant

EXPLANATION

- Buildings
- Foundation Drain
- Storm Drain
- FD Foundation Drain
- SD Storm Drain
- VCP Vitrified Clay Pipe
- CMP Corrugated Metal Pipe
- PVC PVC Pipe
- Fences
- Roads
- Ditch
- Elevation Point
- Outfall
- Sample Station (Current)
- Sample Station (Historical)
- Sample Station (Proposed)
- Station never Sampled
- Alluvial Monitoring Well
- Bedrock Monitoring Well
- 5960 Topographic Elevation
- 5950 Water Table Elevation Spring 1992

0 FEET 50 100 150

FIGURE A-15
INDUSTRIAL AREA IM/IRA/DD

Building 995
Foundation Drain Outfalls

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

FINAL

APPENDIX 7.2

INDUSTRIAL AREA IM/IRA/DD

CONTROL AND DISPOSITION OF INCIDENTAL WATERS

TABLE OF CONTENTS

1. PURPOSE

This procedure provides the requirements for the control and disposition of incidental waters originating from the following Rocky Flats Plant (RFP) water management activities and sources to ensure environmental protection:

- Construction activities that require excavation below the ground water table and subsequent ground water pumping
- Natural collection and subsequent pumping of precipitation and storm water runoff in excavations, pits, trenches, ditches, or depressions that do not intercept the ground water table
- Collection of water in secondary containments, process waste valve vaults, electrical vaults, or manholes that require pumping
- Discharge of water from the Fire Suppression System due to actuation, testing, or maintenance of the Fire Suppression System or other systems that may be using water from the Fire Suppression System

2. SCOPE

This procedure applies to all EG&G Rocky Flats, Inc. employees and subcontractors.

Waters that originate from a drinking water source or runoff from precipitation events in areas that have no possibility of contamination are excluded from the requirements of this procedure, and may be discharged directly to the environment.

This procedure addresses the following activities:

- Identification of Incidental Waters
- Monitoring, Containment, and Collection of Incidental Waters
- Sampling of Incidental Waters
- Analysis of Incidental Water Samples
- Disposition of Incidental Waters
- Termination of an Incidental Water Control Exemption

3. OVERVIEW

The effective operation of the RFP involves several water management activities that may result in incidental waters requiring onsite treatment or discharge to storm drains or the ground. This water may originate as surface water, ground water, utility water, process water, or waste water from the sources discussed in Section 1, Purpose. These discharges have the potential of containing contaminants present at concentrations exceeding some specified acceptable levels. Such levels are based on Colorado State Water Quality Standards, Safe Drinking Water Act Standards, Applicable or Relevant and Appropriate Requirements as defined by the U.S. Environmental Protection Agency or other regulatory agencies, or some other type of RFP-defined levels.

This procedure is intended to ensure that water originating from the sources identified in Section 1, Purpose, is properly controlled, contained, sampled, analyzed, and treated or discharged.

4. DEFINITIONS

Incidental Water Sources. Water originating from one or more of the following sources:

- Excavation sites, pits, trenches, or ditches at construction sites
- Collection of water in secondary containments or berms
- Process waste valve vaults
- Electrical vaults
- Steam pits and other utility pits
- Telephone manholes
- Fire Suppression System discharges
- Natural collection of precipitation and storm water runoff in excavations, pits, trenches, ditches, or depressions that do not intercept the ground water table

5. RESPONSIBILITIES

5.1 Activity Coordinators

Contact the Surface Water Division (SWD) when incidental water that is not excluded from the requirements of this procedure in Section 2, Scope, is encountered.

5.2 Activity Supervisors

Contact SWD when an activity (usually construction) causes the accumulation of water in the excavation area.

Contact SWD before the start of an excavation activity where water is likely to be encountered.

5.3 Analysis Laboratory

NOTE *The analysis laboratory is usually the General Laboratories.*

Performs required water quality analysis.

5.4 Chemical Operation Treatment Personnel

Support the field crew provided by Liquid Waste Treatment Operations with the necessary equipment to collect and transport water from various site locations.

5.5 Fire Department

Collects incidental water in appropriate containment vessels to facilitate sampling and analysis during testing and maintenance activities that have not been exempted.

5.6 Labor & Heavy Equipment Department

Pumps most waters that have been approved for release to the environment upon request from activity coordinators and supervisors.

5.7 Liquid Waste Treatment Operations

Ensures that the following activities are performed with the support of Chemical Operation Treatment personnel:

- Obtaining and transport of the necessary equipment to the field site.
- Pumping of incidental water to a containment vessel.
- Transfer of incidental water to Building 374 or 774 for treatment or disposal.

5.8 Sampling Laboratory

NOTE *The sampling laboratory is usually the General Laboratories.*

Obtains required water samples.

5.9 Surface Water Division

Assists with the coordination of containment, sampling, analysis, and disposition of incidental water.

Receives and interprets analytical results from the laboratory(ies), and makes a final decision on the disposition of incidental water.

Documents and tracks all of the water control activities, including pumping, containment, sampling, analysis results, transfers, storage, and final disposition such as treatment or discharge.

Maintains files of incidental water control records.

5.10 Waste Operations

Stores all incidental waters that cannot be discharged directly to the environment until another treatment or disposal alternative is selected and implemented.

6. INSTRUCTIONS

6.1 Identification of Incidental Waters

Identifying Individual

[1] Notify immediate supervisor upon identification of a new potential source of incidental waters.

NOTE *The SWD contact made in Step 6.1[2] should be made __before__ the start of any new excavation work, if possible.*

Activity Coordinator or Supervisor

[2] Contact SWD, and request that SWD begin evaluation of the new potential source of incidental waters.

This contact may be made by telephone.

[A] Provide SWD with any pertinent information available that may enhance SWD's ability to determine the status of the water.

SWD

[3] Gather information about the water source, including a walkdown of the field site, as practicable.

[4] Complete Blocks 1 through 5 of an Incidental Water Identification & Control (IWIC) Form in accordance with Appendix 1, Incidental Water Identification & Control Form.

6.1 Identification of Incidental Waters (continued)

[5] Assign a unique IWIC Form tracking number to the IWIC Form:

NOTE *SWD maintains a log of all IWIC Forms initiated, including the IWIC numbers assigned.*

[A] Assign the next available sequential IWIC number from the SWD IWIC Form Log, using the following numbering format:

IW-YY-XXX	Where:	IW	≡	Incidental Water
		YY	≡	Last two digits of the year
		XXX	≡	Sequential number

[B] Record this number in Block 6 on all sheets of the IWIC Form.

[6] IF it is suspected that the water source may be exempt from the control requirements of this procedure,
THEN determine if the water source is considered exempt from the requirements of this procedure by completing an Incidental Water Control Exemption Request (IWCER) in accordance with Appendix 2, Incidental Water Control Exemption Request.

[7] Complete Block 7 of the IWIC Form in accordance with Appendix 1.

[8] IF the water source is exempt from the requirements of this procedure,
THEN:

[A] Notify the affected activity coordinator or supervisor.

[B] Notify the organization responsible for the affected area or system, if different from the IWIC initiator's organization.

[C] Ensure that any special conditions or requirements specified in Block 8 of the IWCER are met.

6.1 Identification of Incidental Waters (continued)

[8][D] Disposition the IWIC Form and all attachments in accordance with Section 7, Records.

[E] Exit this procedure.

[9] Complete Blocks 8 through 12 of the IWIC Form in accordance with Appendix 1.

[10] Notify the appropriate sampling laboratory (normally the General Laboratories) of the need to sample the incidental water, and complete Block 13 of the IWIC Form in accordance with Appendix 1.

[11] Notify the initiating organization of the status of the incidental water, including the following, and complete Block 14 of the IWIC Form in accordance with Appendix 1:

- Projected contaminants
- Method of containment
- Monitoring requirements

[12] Record any additional comments in Block 15 of the IWIC Form in accordance with Appendix 1.

[13] Document the completion of Sections 1 and 2 of the IWIC Form in Block 16 of the IWIC Form in accordance with Appendix 1.

[14] Forward an information-only copy of the partially completed IWIC Form to each of the following:

- Initiating organization
- Sampling laboratory (usually the General Laboratories)
- Organization responsible for the affected area or system, if different from the initiator's organization

[15] File the original copy of the IWIC Form for later use.

6.2 Monitoring, Containment, and Collection of Incidental Waters

SWD

[1] Coordinate with the initiating organization and/or the responsible organization, and ensure that Steps 6.2[2] through 6.2[6] are performed, as applicable.

Activity Coordinator or Supervisor

[2] Perform required monitoring of the affected area or system in accordance with the directions in Block 11 of the IWIC Form.

[3] IF desired to minimize excessive delays in activities,
THEN pump incidental waters to an SWD-approved containment vessel for holding until sampling and analysis are complete, and the proper method of disposal has been determined.

[4] Coordinate with SWD to ensure that all utility manholes contain sump pumps with both manual and automatic capability.

Fire Department

[5] IF a fire water sprinkler system is considered exempt, as indicated on the IWIC Form,
AND there is no potential for contamination of the water,
THEN discharge the fire water sprinker system to ground to support testing and maintenance, as appropriate.

[6] IF a fire water sprinkler system is NOT considered exempt, as indicated on the IWIC Form,
OR there is a potential for contamination of the water,
THEN:

[A] Collect incidental water resulting from the following in appropriate SWD-approved containment vessels to facilitate sampling and analysis:

- Fire water sprinkler system actuations
- Fire water sprinkler system testing
- Fire water sprinkler system maintenance

6.2 Monitoring, Containment, and Collection of Incidental Waters (continued)

[6][B] Contact SWD to have the water sampled and analyzed and properly disposed of in accordance with the following:

- Section 6.3, Sampling of Incidental Waters
- Section 6.4, Analysis of Incidental Water Samples
- Section 6.5, Disposition of Incidental Waters

6.3 Sampling of Incidental Waters

Activity Coordinator or Supervisor

[1] Coordinate with SWD, and ensure that the following have all water sampled and analyzed to determine suitability for the water to be discharged directly to the environment:

- Utility manholes
- Electrical vaults
- Telephone vaults
- Steam and other utility pits
- All transformer berms that are inside potentially contaminated areas

SWD

[2] Assist the designated sampling laboratory (usually the General Laboratories) with the sampling of the incidental water, as necessary.

[3] IF the activity or source of the incidental water is in an area of known or suspected contamination [such as in or near a solid-waste management unit (SWMU) or an individual hazardous substance site (IHSS)],
THEN determine if samples to support additional chemical analyses need to be performed.

In this case, the analyses may be performed by an EG&G/RFP-approved contract laboratory.

Sampling Laboratory

[4] Provide a sampling crew upon request by SWD to collect all required incidental water samples.

6.3 Sampling of Incidental Waters (continued)

Sampling Crew

[5] Prepare incidental water samples in accordance with Procedure L-6245, Sample Procedure for Waste Characteristics, and ensure that samples for the analyses specified in Block 12 of the IWIC Form are collected.

[6] Transport the samples to one of the following laboratories, as appropriate, in accordance with applicable chain-of-custody and transportation requirements for such materials onsite:

- General Laboratories
- Environmental Radiochemistry Laboratory (backup to the General Laboratories)
- Another onsite or offsite laboratory if needed analyses are beyond the normal capabilities of the General Laboratories and the Environmental Radiochemistry Laboratory

6.4 <u>Analysis of Incidental Water Samples</u>

Analysis Laboratory

[1] Analyze the incidental water samples for the parameters specified in Block 12 of the IWIC Form in accordance with one of the following, as appropriate:

- Procedure L-6245 for EG&G Rocky Flats, Inc. laboratories
- ~~An RFP-approved subcontractor procedure for subcontractor laboratories~~

[2] IF the activity or source of the incidental water is in an area of known or suspected contamination (such as in or near an SWMU or an IHSS), THEN contact SWD to determine if additional chemical analyses should be performed for specific known or likely water quality parameters.

In this case, the analysis may need to be performed by an EG&G/RFP-approved contract laboratory.

[3] Forward a copy of the incidental water sample analysis results to SWD and to the activity coordinator or supervisor.

6.4 Analysis of Incidental Water Samples (continued)

NOTE *In Step 6.4[4], the sample parameter values used for comparison with the control limits expressed in Table 1, Water Quality Parameter Control Limits, are the mean values plus a 95% confidence level uncertainty.*

SWD

[4] Receive and interpret analytical results from the laboratory(ies), referring to the control limits summarized in the following table and any other limits established by the SWD Manager, as applicable:

TABLE 1, WATER QUALITY PARAMETER CONTROL LIMITS

PARAMETER	LIMIT
Gross Alpha	40 Pci/l
Gross Beta	50 Pci/l
pH	6.0 - 9.0
Nitrates as N	10 mg/l
Conductivity	700 umho/cm

Any incidental water that exceeds the control limit for any parameter in Table 1, or exceeds any other control limit established by the SWD Manager, is required to be contained, and may not be discharged directly to the environment.

[5] IF the sample analyses results are NOT within established limits,
AND there is reason to suspect that either the sample or the analyses may have been corrupted or unrepresentative,
THEN arrange for resampling and/or reanalysis, as appropriate.

[6] IF further characterization of the incidental water is warranted,
THEN:

[A] Have the appropriate laboratory(ies) perform additional analyses.

[B] Document any additional parameter sampling requirements in Block 12 of the IWIC Form in accordance with Appendix 1.

6.4 Analysis of Incidental Water Samples (continued)

[7] Complete Blocks 17 through 21 of the IWIC Form in accordance with Appendix 1.

[8] IF additional analyses of the incidental water indicate high concentrations of regulated constituents,
THEN:

[A] Notify the Resource Conservation & Recovery Act (RCRA) Permitting Group that the water may be hazardous waste.

[B] Document this notification in Block 21 of the IWIC Form.

[9] Make a final decision on the disposition of incidental water, and complete Blocks 22 and 23 of the IWIC Form in accordance with Appendix 1.

[10] Document completion of Section 3 of the IWIC Form in Block 24 in accordance with Appendix 1.

6.5 Disposition of Incidental Waters

NOTE *The affected activity coordinator or supervisor with assistance from the Labor & Heavy Equipment Department is responsible for discharging uncontaminated incidental water directly to the environment (that is, to the storm drain or to the ground), while Liquid Waste Treatment Operations is responsible for dispositioning all other classifications of incidental water.*

SWD

[1] Contact the activity coordinator or supervisor to disposition the incidental water in an appropriate manner depending on the analyses results.

Activity Coordinator or Supervisor

[2] IF the incidental water can be discharged directly to the environment, THEN:

[A] Contact the Labor & Heavy Equipment Department for assistance in performing Steps 6.5[2][B] and 6.5[2][C], as necessary.

[B] Obtain and transport the necessary equipment to the field site.

[C] Discharge the incidental water to the storm drain or to the ground; as appropriate.

[D] Contact SWD to document the following information on the IWIC Form in accordance with Appendix 1:

- Block 25 - volume of water that was transferred or disposed of
- Block 26 - any concerns or problems noted

[3] IF the incidental water CANNOT be discharged to the environment, THEN contact Liquid Waste Treatment Operations for assistance.

6.5 Disposition of Incidental Waters (continued)

Liquid Waste Treatment Operations

[4] IF the incidental water CANNOT be discharged to the environment, THEN:

[A] Coordinate with Chemical Operation Treatment personnel and Waste Operations, and provide a field crew with the necessary equipment to collect and transport incidental water from various site locations as necessary.

[B] Obtain and transport the necessary equipment to the field site.

[C] Pump the incidental water to a containment vessel.

[D] Transfer the water to the location specified in Block 23 on the IWIC Form.

[E] Contact SWD to document the following information on the IWIC Form in accordance with Appendix 1:

- Block 25 - volume of water that was transferred or disposed of
- Block 26 - any concerns or problems noted

SWD

[5] Notify the initiating organization of the disposed status of the incidental water, and complete Block 27 of the IWIC Form in accordance with Appendix 1.

[6] Document verification of the proper disposition of the incidental water in Block 28 of the IWIC Form in accordance with Appendix 1.

[7] Retain a copy of the IWIC Form, and forward the original to the organization responsible for the affected area or system for sign-off.

Responsible Organization Representative

[8] Review the IWIC Form, and document acknowledgement of the disposition of the incidental water in Block 28 of the IWIC Form in accordance with Appendix 1.

[9] Return the original copy of the IWIC Form to SWD within 5 working days.

6.6 Termination of an Incidental Water Control Exemption

SWD

[1] IF a water source was previously determined to be exempt,
AND SWD has determined a need to terminate the exemption,
THEN:

[A] Notify the organization responsible for the affected area or system to terminate the exemption.

This notification may be made by telephone.

[a] Document this notification in a memorandum, and forward a copy to the organization responsible for the affected area or system.

[B] Process a new IWIC Form and IWCER as if the water source was a newly discovered source in accordance with this procedure.

7. RECORDS

SWD

[1] Ensure that all of the incidental water control activitie were properly documented on the IWIC Form.

[2] Send the following documents to the Environmental Management Records Group for retention in accordance with 1-77000-RM-001, Record Management Guidance for Records Sources:

- The original IWIC Form
- All attachments to the IWIC Form
- A copy of all memorandums documenting SWD's intent to terminate an incidental water control exemption

8. REFERENCES

L-6245, Sample Procedure for Waste Characteristics

1-77000-RM-001, Record Management Guidance for Records Sources

APPENDIX 1
Page 1 of 4

INCIDENTAL WATER IDENTIFICATION & CONTROL FORM (RF-47974)

INCIDENTAL WATER IDENTIFICATION & CONTROL FORM

Sheet 1 of 2

☐ Continuation Sheet Attached.

6. IWIC NO.:

SECTION 1 - IDENTIFICATION

1. DATE:
2. REQUESTOR: Name: Dept.: Bldg.: Extension/Page:
3. SWD INITIATOR: Name: Dept.: Bldg.: Extension/Page:
4. LOCATION/SOURCE OF INCIDENTAL WATER:
5. KNOWN CHARACTERISTICS/APPROXIMATE QUANTITY OF INCIDENTAL WATER:

SECTION 2 - PRELIMINARY EVALUATION

7. IS WATER SOURCE EXEMPTED FROM CONTROL REQUIREMENTS OF 1-C91-EPR-SW.01? ☐ Yes ☐ No
If Yes, then attach a completed and approved Incidental Water Control Exemption Request.
8. ORGANIZATION RESPONSIBLE FOR THE AFFECTED AREA/SYSTEM:
9. PROJECTED CONTAMINANTS:
10. PROJECTED METHOD OF CONTAINMENT:
11. MONITORING REQUIREMENTS:
12. PARAMETER SAMPLING REQUIREMENTS:
- ☒ pH
- ☒ NO_3 as N
- ☒ Gross Alpha
- ☒ Gross Beta
- ☒ Conductivity
- ☐ Other (specify): ____________

13. SAMPLING LABORATORY NOTIFIED: Date/Time: Name: Dept.: Bldg.: Extension/Page:
14. INITIATING ORGANIZATION NOTIFIED: Date/Time: Name: Dept.: Bldg.: Extension/Page:
15. COMMENTS:
16. SURFACE WATER DIVISION REPRESENTATIVE: Printed Name: Signature: Date:

SAMPLE

RF-47974 (08/93)

APPENDIX 1
Page 2 of 4

INCIDENTAL WATER IDENTIFICATION & CONTROL FORM

Sheet 2 of 2

6. IWIC NO.:

☐ Continuation Sheet Attached.

SECTION 3 - SAMPLING & ANALYSIS

17. DATE SAMPLED:
18. DATE SAMPLE RESULTS RECEIVED:

19. LABORATORY NO./ID:

20. ANALYTICAL RESULTS:

pH: ____________ NO_3 as N: ____________

Gross Alpha: ____________ Gross Beta: ____________ Conductivity: ____________

Other (specify): ____________

21. EVALUATION OF DATA:

22. AUTHORIZED METHOD OF DISPOSAL/TRANSFER:

Effective Dates: ____________ - ____________

23. DESTINATION:

☐ To Storm Drain ☐ To Bldg. 374
☐ To Ground ☐ To Bldg. 774
☐ To Sanitary Sewer ☐ Other (specify): ____________

SAMPLE

24. SURFACE WATER DIVISION REPRESENTATIVE:

Printed Name: Signature: Date:

SECTION 4 - DISPOSAL

25. VOLUME TRANSFERRED/DISPOSED OF:

26. COMMENTS:

27. INITIATING ORGANIZATION NOTIFIED: Date/Time:

Name: Dept.: Bldg.: Extension/Page:

28. THE INCIDENTAL WATER HAS BEEN PROPERLY DISPOSED OF/TRANSFERRED.

SURFACE WATER DIVISION REPRESENTATIVE:

Printed Name: ____________ Signature: ____________ Date: ____________

RESPONSIBLE ORGANIZATION REPRESENTATIVE:

Printed Name: ____________ Signature: ____________ Date: ____________

RF-47974 (05/93)

APPENDIX 1
Page 3 of 4

INCIDENTAL WATER IDENTIFICATION & CONTROL FORM CONTINUATION SHEET

Sheet _____ of _____

6. IWIC NO.:

CONTINUING REMARKS:

SAMPLE

RF-47974 (02/93)

APPENDIX I
Page 4 of 4

BLOCK	COMPLETED BY:	INSTRUCTIONS
1	SWD Representative	Record the current date.
2	SWD Representative	Record the name, department, building, and extension/digital pager of the requester.
3	SWD Representative	Record the SWD initiator's name, department, building, and extension/digital pager.
4	SWD Representative	Record a concise description of where the incidental water can be located, including what the source of the water is.
5	SWD Representative	Record a description of the known characteristics and quantity of the incidental water.
6	SWD Representative	Assign and record a unique IWIC Form tracking number on each page of the IWIC Form.
7	SWD Representative	Check (√) *Yes* or *No*. IF *Yes* is checked, THEN attach a completed and approved Incidental Water Control Exemption Request (IWCER).
8	SWD Representative	Record the name of the organization with primary responsibility for the condition of the affected area or system.
9	SWD Representative	Record any anticipated water contaminants based on the known sources and uses of the water.
10	SWD Representative	Record the projected method of containment based on the anticipated water contaminants.
11	SWD Representative	Record the monitoring requirements based on anticipated water contaminants and on the rate of water accumulation.
12	SWD Representative	IF any special tests [such as tests for metals or volatile organic compounds (VOCs)] are required, THEN record them after checking (√) the *Other* box. The boxes for tests of pH, NO_3 as N, gross alpha, gross beta, and conductivity have already been checked.
13	SWD Representative	Document the name, department, building, and extension/digital pager of the sampling laboratory contact, and the date and time of the notification.
14	SWD Representative	Document the name, department, building, and extension/digital pager of the initiating organization contact, and the date and time of the notification.
15	SWD Representative	Record any necessary additional comments or special concerns.
16	SWD Representative	Print name, then sign and date.
17	SWD Representative	Record the date of the incidental water samples.
18	SWD Representative	Record the date that the incidental water samples were received.
19	SWD Representative	Record an identification number and/or noun name for the laboratory that performed the sample analyses.
20	SWD Representative	Record the water sample analyses results. Concentrations are normally expressed as fractions of the release (control) limits. Values that are less than 5% may be expressed as <5%.
21	SWD Representative	Provide a brief summary of conclusions drawn based on the sample analyses results. Include any special control limits that may have been established by the SWD Manager.
22	SWD Representative	Record the appropriate method of disposal or transfer of the incidental water, and record the effective dates for this authorization.
23	SWD Representative	Check (√) the appropriate destination for the incidental water being disposed of or transferred. IF an unlisted destination is required, THEN record it after checking (√) the *Other* box.
24	SWD Representative	Print name, then sign and date.
25	SWD Representative	Record the amount of incidental water disposed of or transferred based on information provided by the organization performing the disposal or transfer.
26	SWD Representative	Record any necessary additional information or special concerns.
27	SWD Representative	Document the name, department, building, and extension/digital pager of the initiating organization contact, and the date and time of the notification.
28	SWD Representative	Print name, then sign and date.
28	Responsible Organization Representative	Print name, then sign and date.

IF a continuation sheet is used, THEN check (√) the applicable box at the top of the IWIC Form.

RF-47974 (08/93)

APPENDIX 2
Page 1 of 3

INCIDENTAL WATER CONTROL EXEMPTION REQUEST (RF-47973)

INCIDENTAL WATER CONTROL EXEMPTION REQUEST

Sheet 1 of 1

☐ Continuation Sheet Attached.

6. IWIC NO.:

SECTION 1 - IDENTIFICATION

1. DATE:
2. RESPONSIBLE ORGANIZATION:
3. SWD INITIATOR:
   Name: Dept.: Bldg.: Extension/Page:
4. LOCATION/SOURCE OF INCIDENTAL WATER:
5. CHARACTERISTICS/APPROXIMATE QUANTITY OF INCIDENTAL WATER (IF KNOWN):

SECTION 2 - EVALUATION

7. SCREENING QUESTIONS:

1. Does water originate from a drinking water source or runoff from precipitation events in areas that have no possibility of contamination? ☐ Yes ☐ No

2. Is the water source free of any credible potential of being contaminated? ☐ Yes ☐ No
   (If Yes, then list supporting documentation reviewed below, and attach copies to this form.)

   Supporting Documentation Reviewed:

   ____

   ____

   ____

3. EXEMPTION RECOMMENDED? ☐ Yes ☐ No

NOTES: *If either of the above screening questions are answered No, then the incidental waters in question may not be exempted from the requirements of Procedure 1-C91-EPR-SW.01.*

If both of the screening questions above are answered Yes, then the incidental waters in question may be exempted from the requirements of 1-C91-EPR-SW.01. Any special conditions for the incidental waters that are defined in Block 8 below must be adhered to in order to maintain the exemption.

8. SPECIAL CONDITIONS AND COMMENTS: ☐ NOT Applicable

9. SURFACE WATER DIVISION PREPARER:
   Printed Name: Signature: Date:

10. SURFACE WATER DIVISION INDEPENDENT REVIEWER:
   Printed Name: Signature: Date:

11. SURFACE WATER DIVISION MANAGER:
   ☐ Exemption Granted ☐ Exemption Denied
   Printed Name: Signature: Date:

SAMPLE

RF-47973 (03/93)

APPENDIX 2
Page 2 of 3

INCIDENTAL WATER CONTROL EXEMPTION REQUEST CONTINUATION SHEET

Sheet ____ of ____

6. IWIC NO.:

CONTINUING REMARKS:

SAMPLE

APPENDIX 2
Page 3 of 3

BLOCK	COMPLETED BY:	INSTRUCTIONS
1	SWD Representative	Record the current date.
2	SWD Representative	Record the name of the organization that is primarily responsible for the affected area or system.
3	SWD Representative	Record the SWD initiator's name, department, building, and extension/digital pager.
4	SWD Representative	Record a concise description of where the incidental water can be located, including what the source of the water is. This can be obtained from Block 4 of the associated IWIC Form.
5	SWD Representative	Record a description of the characteristics and quantity of the incidental water, if known. Otherwise, record *To Be Determined*. This can be obtained from Block 5 of the associated IWIC Form.
6	SWD Representative	Record the IWIC Form number that also appears in Block 6 of the associated IWIC Form.
7	SWD Representative	Check (√) either *Yes* or *No* for each question. List all supporting documentation reviewed in order to answer Question 2, and attach copies to the IWCER. Question 3 can only be answered *Yes* if the answers to Questions 1 and 2 are both *Yes*.
8	SWD Representative	Record any special conditions (such as monitoring requirements) and other pertinent comments.
9	SWD Representative	Print name, then sign and date, then forward to an SWD independent reviewer.
10	SWD Independent Reviewer	Review the IWCER for validity. Print name, then sign and date, if valid. Resolve any concerns with the SWD Representative.
11	SWD Manager	Review the IWCER for validity. Print name, then sign and date, if valid. Resolve any concerns with the SWD Representative.
IF a continuation sheet is used, THEN check (√) the applicable box at the top of the IWCER.		

SAMPLE

Section 8.0

8.0 CONCEPTUAL SITE MODEL

The conceptual site model for the RFP Industrial Area addresses potential contaminant transport pathways associated with existing sources of contamination, including designated IHSSs in the nine Industrial Area OUs, PCB sites, UBC areas, routine effluents, and contaminant transport pathways associated with potential sources where release of constituents may occur, such as product or waste storage locations, building-specific sources, or other possible sources in the Industrial Area. Contaminant migration from existing or potential sources is assessed by examining two scenarios: (1) current or actual conditions and (2) the occurrence of unplanned events.

Development of the conceptual site model was based on draft conceptual models of each of the nine OUs in the Industrial Area and media-specific information from the evaluations of existing environmental monitoring systems presented in earlier sections of this report. The combined information has been consolidated and summarized to provide a general conceptualization of potential contaminant migration from sources in the Industrial Area. Appropriate EPA guidance documents were used including *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA 1988) and *Risk Assessment Guidance for Superfund - Volume I, Human Health Evaluation Manual (Part A)* (EPA 1989).

A conceptual site model generally addresses each component of a completed exposure pathway, including the contaminant source, release mechanism, transport medium, exposure route, and receptor (Figure 8-1). For the purposes of this document, the exposure route and receptor components were not considered because this IM/IRA/DD focuses on early identification of potential contaminant releases from the Industrial Area that are expected to be mitigated before reaching potential receptor exposure points.

FINAL

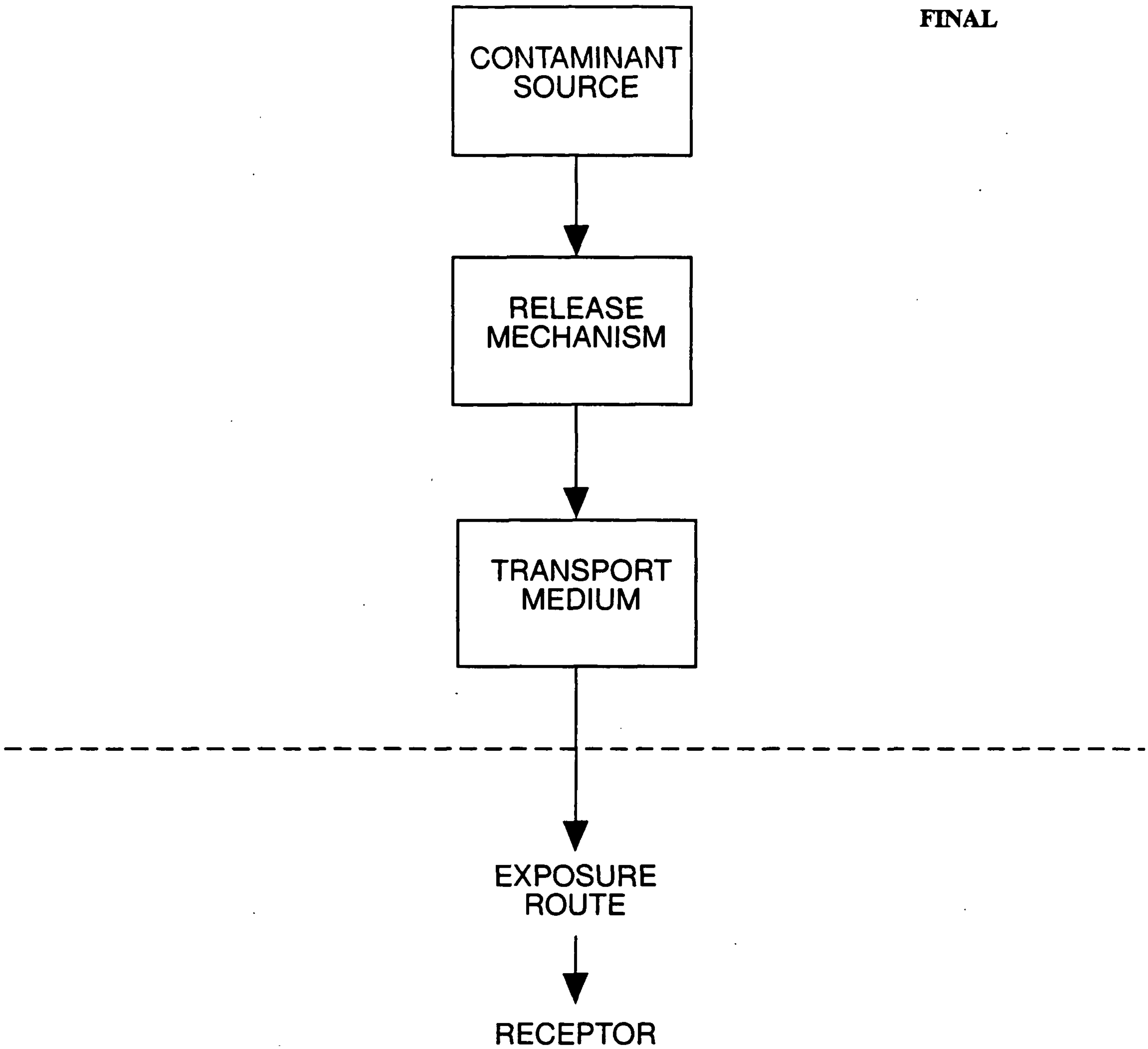


FIGURE 8-1
Industrial Area IM/IRA/DD
Components of a Completed Exposure Pathway

H:\WP\FLATS\FIG8-1.FH3

8.1 CONSTITUENTS OF POTENTIAL CONCERN AND SOURCES

The COPCs for surface water, sediment, and groundwater were identified in Appendix 3.1. A separate COPC list for air was provided in Appendix 3.2. The appendices provide a comprehensive listing of chemicals or radionuclides that may exist at the numerous potential contaminant release sources in the Industrial Area as a result of past accidental releases or improper disposal by former management practices. The COPC list allows preliminary identification of contaminants that currently exist or that could be transported in site soils, groundwater, surface water, sediment, or air. COIs, presented in Appendices 3.6 through 3.8, address potential releases associated with unplanned events. The extensive number of COIs includes consideration of chemical product and waste stream inventories. The lists of COIs were compiled to ensure that substances stored in the Industrial Area that were not on the COPC list were included in the evaluation of environmental monitoring systems.

Current sources of contamination within the Industrial Area include designated IHSSs within the nine OUs in the Industrial Area (Appendix 3.3), PCB sites (Appendix 3.4), UBC areas (Appendix 3.5), and building-specific release points such as exhaust vents and foundation drains. Potential sources where releases could occur during an unplanned event include permitted waste storage areas, product storage areas, or accidental releases during a fire or explosion in the Industrial Area. Because the number of specific sources is too large to allow individual identification of each source in the conceptual site model, existing sources of contamination and potential sources were grouped into general source types based on similarities in release mechanisms. The general groupings facilitated development of the conceptual site model flow diagrams discussed below. Primary and secondary sources have been identified in the conceptual site model for the Industrial Area.

The conceptual site model for the Industrial Area summarizes the general types of sources and identifies contaminant release mechanisms and transport media. Primary and secondary sources under the current scenario and unplanned event scenarios are presented in the conceptual site model flow diagrams in Figures 8-2 and 8-3, respectively. Figures 8-4 and 8-5 provide schematic representations of the current and unplanned-event conceptual site models.

A primary contamination source is the principal origin of contamination. Chemical or radioactive constituents associated with a primary source may have been released in a historical incident and may currently be subject to transport in the environment, or constituents may potentially be released from a primary source in an unplanned event. Contaminant migration is further characterized within the conceptual site model by identification of secondary sources. A secondary source is generally the receiving medium or primary transport medium, such as soil, surface water, or groundwater, where further release of contamination may occur. Air is not considered a secondary source because it is considered only to be a transport medium. A constituent released to the air may be transported directly to a receptor or eventually deposited by particulate deposition, washout, or rain-out onto surface soil or surface water, which is the secondary source.

Many of the IHSSs were designated as a result of historical spills, leaks, or overflows from a tank or drum. In most cases, contamination was released directly to the soil; therefore, surface soil is the secondary source. Subsurface soil may become a secondary source by infiltration and percolation of constituents from contaminated surface soil or from contaminated surface water in unlined drainages or retention ponds.

Contamination from UBC areas or past underground leaks may be released directly to groundwater, which would then be the secondary source. Surface water as a secondary

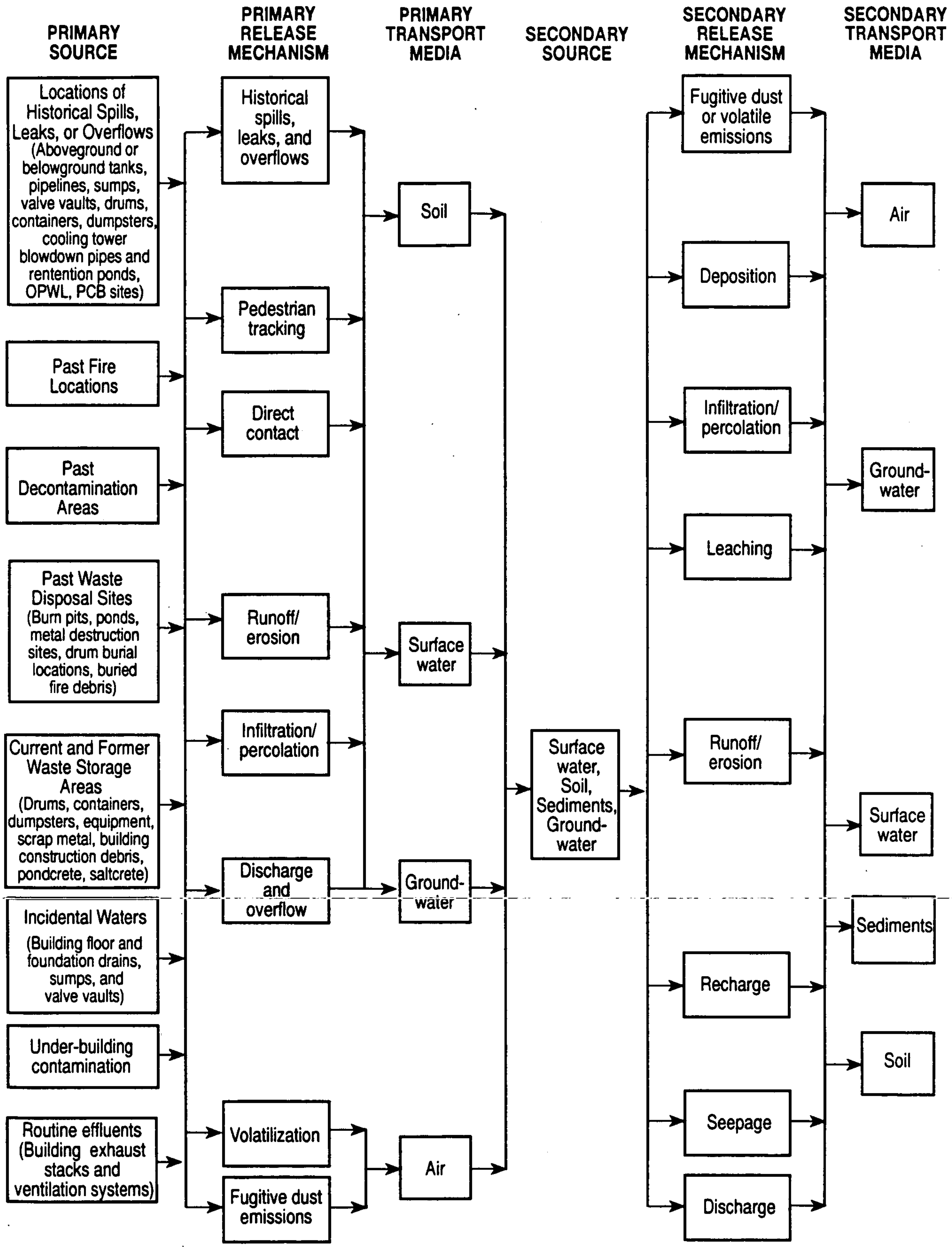


FIGURE 8-2
Industrial Area IM/IRA/DD
Conceptual Site Model Flow Diagram
Current Scenario

H:\WP\FLATS\FIG9-1.FH3

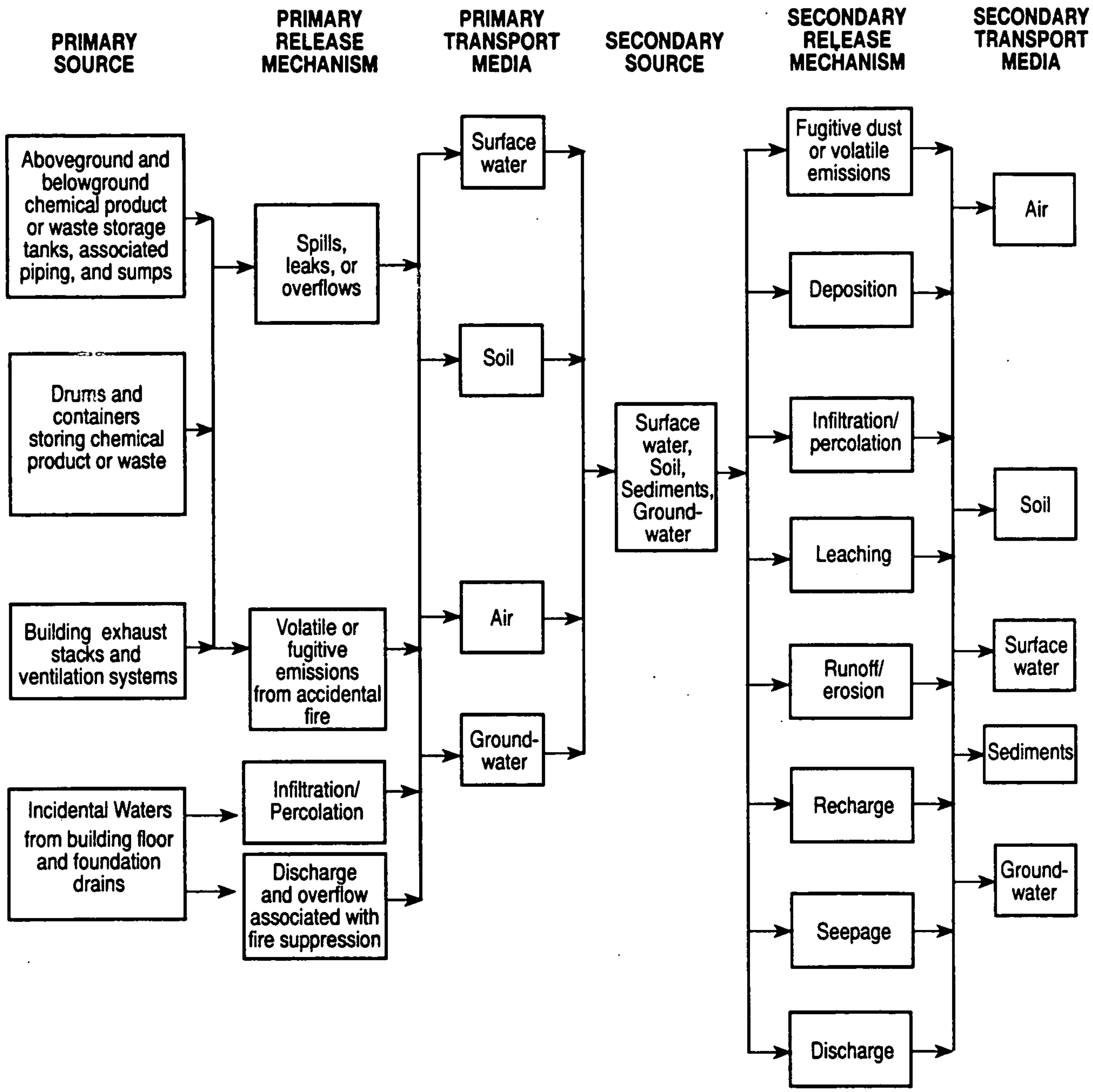
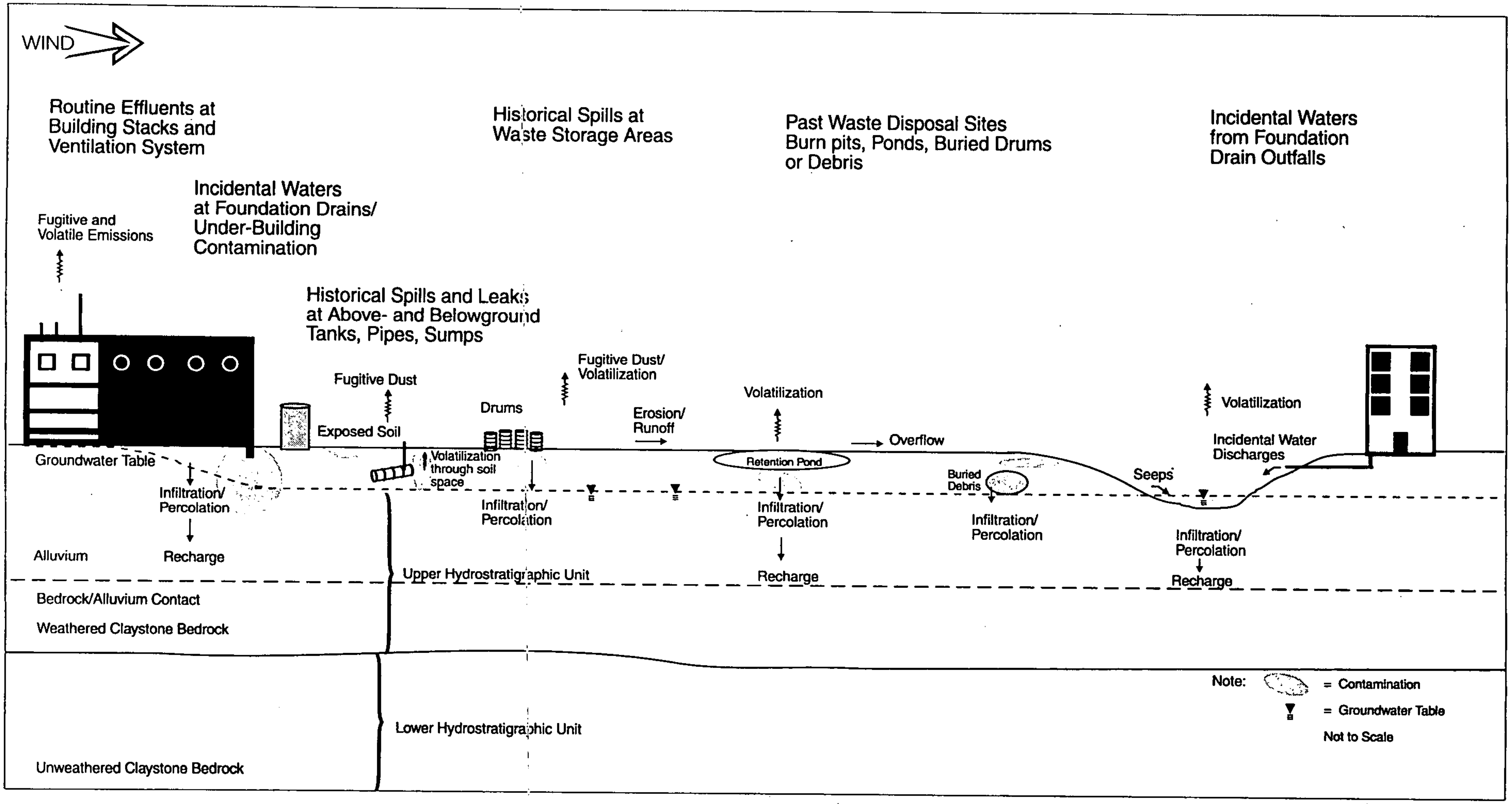
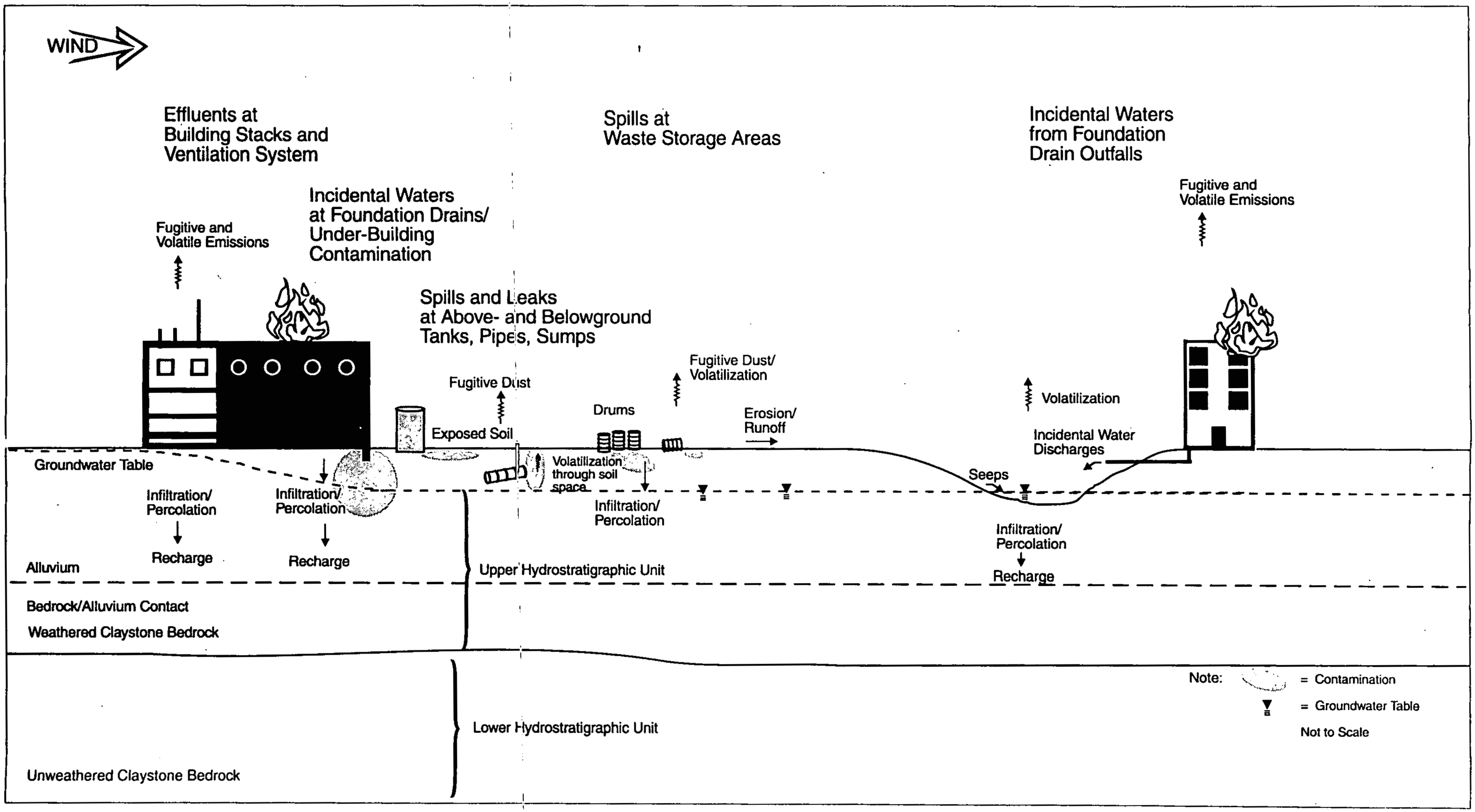


FIGURE 8-3
Industrial Area IM/IRA/DD
Conceptual Site Model Flow Diagram
Unplanned Event Scenario



WP\FLATS\IM-IRA\DRAW2.CDR

FIGURE 8-4
Industrial Area IM/IRA/DD
Conceptual Site Model - Current Scenario



WP\FLATS\IM-IRA\FIG8-5.CDR

FIGURE 8-5
Industrial Area IM/IRA/DD
Conceptual Site Model - Unplanned Event Scenario

source may occur as a result of (1) direct discharges to drainages (e.g., outfalls of building foundation drains) or (2) the migration of runoff from contaminated surfaces. Similarly, sediment can be a secondary source as a result of the erosion of contaminated surface soil or adsorption of surface water contaminants to bottom sediments.

Contamination from many of the existing sources, such as IHSSs associated with historical incidents, may have already migrated to secondary sources. Unplanned releases may also migrate to a secondary source, although RFP has emergency response requirements in place and onsite hazardous materials response teams that respond and take the necessary steps for containment, control, and cleanup.

8.2 TRANSPORT PATHWAYS

The environmental monitoring system evaluations presented in previous sections included characterization of possible contaminant migration pathways specific to each particular medium. A transport or migration pathway consists of a release mechanism and transport media. As shown in Figures 8-2 and 8-3, primary and secondary release mechanisms and transport media are defined for the primary and secondary sources, thereby addressing all potentially affected media.

8.2.1 Primary Release Mechanisms

Release mechanisms for primary sources under the current scenario include (1) historical spills, leaks, or overflows; (2) volatilization from contaminated soils and surface waters; (3) fugitive dust emissions from contaminated surface soils; (4) runoff, erosion, or overland flow of contaminated soil or surface water; (5) infiltration and percolation of contaminants through soil; (6) discharge and overflow from building foundation drains; (7) pedestrian tracking of contamination associated with historical spills or fires; (8)

volatile or fugitive dust emissions as routine effluents from building exhaust stacks and ventilation systems; and (9) direct contact with radioactively contaminated equipment.

Under the unplanned events scenario, primary release mechanisms include (1) potential spills, leaks, or overflows from aboveground or belowground tanks, pipelines, sumps, or valve vaults; (2) potential spills, leaks, or overflows from drums or containers; (3) volatile or fugitive emissions from an accidental fire; (4) infiltration and percolation of contaminants released from building floor and foundation drains; and (5) discharge and overflow associated with fire suppression activities.

8.2.2 Primary Transport Media

Primary transport media are the media directly affected by the initial contaminant release. The affected media will be influenced by the source type and the specific release mechanisms. Transport media may be air, soil, surface water, or groundwater.

Airborne transport may occur as a result of routine effluents, volatile emissions from soil and surface water, and windblown surface soil migrating as fugitive dust. Airborne contaminants may be transported directly to a receptor or may eventually be deposited to a secondary source such as surface soil, sediment, or surface water by particulate deposition, rain-out, or washout. Contaminants released directly to the soil can be transported to a secondary source by infiltration and percolation, leaching, overland runoff, or erosion. Contaminants may be transported by surface water in overland runoff when direct release to surface flow occurs. Releases from belowground tanks and piping, UBC, or buried sources may leach into surrounding soils or, as is the case with UBC, may be directly released to groundwater.

8.2.3 Secondary Release Mechanisms

As seen in Figures 8-2 and 8-3, release mechanisms for secondary sources are similar for the current and unplanned-event scenarios. When soil is a secondary source, contamination can be further transported by fugitive dust or volatile emissions; erosion to adjacent soils or nearby drainages; or by infiltration and percolation, and subsequent leaching to groundwater. Groundwater transport of contaminants may affect surrounding soils as a result of infiltration and percolation or recharge. Chemical adsorption to soils may occur, or contaminants may volatilize through the soil pore space to the atmosphere. These processes will depend on the soil type and the contaminant's physical properties. Groundwater may also release contaminants in surface seeps or, in the case of incidental waters, from building foundation drain outfalls, resulting in soil and possibly surface water contamination.

Surface water can transport dissolved contaminants or contaminants adsorbed to suspended matter in overland runoff or in natural or man-made drainages. Infiltration and percolation of contaminated surface water through the soil can occur and may lead to contaminant contribution to subsurface soils and potential leaching to groundwater. Sediment transport in drainages will be influenced by water flows. Airborne releases of contaminated sediments as fugitive dust may occur during periods of low flow.

8.2.4 Secondary Transport Media

The secondary release mechanisms may lead to further contaminant migration via secondary transport media. For example, secondary soil sources may contribute to subsurface migration in groundwater as a result of infiltration, percolation, and subsequent leaching to the groundwater aquifer. Windblown fugitive dust emissions from a secondary soil source may be deposited to other surface areas or waters where additional transport could occur. Erosion and runoff of contaminated soils to surface drainages may allow surface water or sediment transport.

Groundwater seeps released to surficial soils may reenter the groundwater system via infiltration and percolation, or airborne transport may occur from contaminant volatilization or fugitive dust emissions of the contaminated surface soil. Contaminants released in groundwater seeps and building foundation drain outfalls may migrate in surface water or sediments in natural drainage channels.

8.3 RELATIONSHIP OF THE CONCEPTUAL SITE MODEL TO CURRENT MONITORING PROGRAMS

The evaluation of the relationship of the conceptual site model to existing monitoring programs involves an examination of the adequacy of current monitoring for detecting potential releases migrating from sources in the Industrial Area. Previous sections summarized current monitoring for each medium and provided recommendations for current monitoring. Monitoring locations were evaluated relevant to potential contaminant sources and transport pathways, and analytes of the current monitoring programs were compared to the list of COPCs. The following subsections summarize the relationship of the conceptual site model to current monitoring programs and discuss how recommended changes to monitoring will improve detection of contaminant releases within the Industrial Area.

8.3.1 Groundwater

Contamination may enter groundwater from (1) infiltration and percolation of soil or surface water contaminants with subsequent leaching to the water table or (2) direct interaction between building foundation drains and the shallow bedrock of the upper hydrostratigraphic unit. The current groundwater monitoring program was discussed in Section 4.3.

Table 4-3 listed 183 monitoring wells in the Industrial Area and included information on their current status (as of October 14, 1993). According to Table 4-3, 155 wells are active, 23 are abandoned, and five are currently inactive. Samples are currently collected quarterly from 97 of the 183 wells in the Industrial Area. Of these 97 wells, 83 wells are screened in the UHSU, 10 are screened in the lower hydrostratigraphic unit, and four are transitional wells (screened in both units). All wells are analyzed for the constituents identified in Table 4-4.

Characteristics of groundwater flow were discussed in Section 4.2. The following potential contaminant transport pathways were identified in the conceptual site model for groundwater:

- horizontal migration in the upper hydrostratigraphic unit with groundwater flow away from paleotopographic ridges and along paleotopographic drainages;
- vertical migration within the upper hydrostratigraphic unit corresponding to hydraulic gradients and influenced by seasonal recharge;
- possible vertical migration via advective transport from the upper hydrostratigraphic unit to the lower hydrostratigraphic unit;
- possible vertical and horizontal migration in the sandstone units of the Laramie Formation as a result of recharge from building footing drains completed in bedrock and influenced by downward hydraulic gradients;
- alluvial groundwater discharges at springs and seeps; and
- limited discharges to stream drainages.

The summary of existing data was presented in Section 4.5. Known source areas currently contributing to groundwater contamination in the Industrial Area include the Solar Evaporation Ponds (OU4); the 903 Pad, Mound, East Trenches, and East Spray Field (OU2); and the area around the 881 Hillside (OU1). The latter two source areas are located adjacent to the Industrial Area, and groundwater contamination may have migrated toward the Industrial Area. Recent (November/December 1993) groundwater sampling also identified groundwater contamination in the central Industrial Area, as described in Section 4.5. The Solar Ponds, the 903 Pad area, and the Upper South Walnut Creek area near the Industrial Area boundary (Mound Area) have also been identified as sources of surface water contamination (EG&G 1992a,b).

Plates 4-1 and 4-2 show wetland/seep locations where groundwater from the upper hydrostratigraphic unit may discharge. As discussed in the conceptual site model, the discharge may allow surrounding soils to become contaminated as a result of recharge and infiltration. Contaminant migration to nearby surface drainages via overland flow may also occur. IHSSs or UBC areas located upgradient of the seeps may contribute to contaminant loading of the groundwater discharging at wetland/seep locations. Wetlands/seeps in the Industrial Area can be associated with surface water drainage pathways described in Section 5.4. Further evaluation of surface water drainages and transport pathways relative to the conceptual site model is provided in Section 8.3.2.

The potential for UBC has been identified at 31 buildings in the Industrial Area (EG&G 1992c). These potential source areas may also be contributing to groundwater contamination. Table 5-24 identified building foundation drains and their flow paths. Results of aperiodic sampling of building sumps and foundation drains have shown chemical and radionuclide constituents at some locations. Contaminants released in an unplanned event could enter groundwater along these flow paths.

An examination of existing well locations relative to potential sources that may contribute to groundwater contamination was conducted as part of the evaluation of existing monitoring programs in Section 4.6. The evaluation determined that groundwater monitoring is generally adequate for IM/IRA purposes in the eastern Industrial Area. RCRA monitoring and CERCLA monitoring of OU2 and OU4 provide data that are useable for monitoring releases in the eastern portion of the Industrial Area. Because groundwater monitoring in the western and central Industrial Area was not considered adequate for early detection of releases to groundwater, a number of existing wells and piezometers are proposed for incorporation into the routine groundwater monitoring program (Table 4-10 and Figure 4-6). Installation of several new wells is also proposed for the central Industrial Area (Table 4-11 and Plate 4-1).

Additional monitoring and use of OU characterization data that become available will improve the identification of groundwater transport pathways and will allow early detection of current and unplanned contaminant releases in the Industrial Area. Proposed actions address additional data needs in current monitoring and are based on potential sources and likely contaminant migration pathways in the groundwater flow. Development of baseline conditions will improve delineation of upgradient sources and identification of changes in groundwater contaminant levels due to an unplanned event.

8.3.2 Surface Water

The conceptual site model shows that surface water and sediment may be primary transport media, secondary sources of contamination, and secondary transport media in the Industrial Area. As discussed earlier, contaminants may be released to surface water drainages within the Industrial Area as a result of runoff and erosion from historically contaminated IHSSs, groundwater seeps, building foundation drain outfalls, or an unplanned event such as a spill, leak, or overflow. Surface water ponds located in the Industrial Area, such as the Solar Ponds and cooling tower blow-down retention ponds, may have received chemical constituents from historical discharges.

The evaluation of existing monitoring presented in Section 5.2 focused on NPDES stormwater monitoring locations, the Event-Related Surface Water Monitoring Program, and monitoring at the waste water treatment plant, all of which were deemed pertinent to the Industrial Area. Section 5.4 described the drainage patterns for each of the seven drainage pathways in the Industrial Area, including subbasin outlets in the pathway, major buildings in the subbasins, the acreage of the area drained to each subbasin, and drainage destinations. Sources that may currently contribute to contaminant migration in runoff or overland flow along the drainage pathways may include foundation drain outfalls from buildings with possible UBC, runoff from IHSSs or PCB sites, and groundwater seeps. Table 5-23 provided a cross-reference of buildings to the various drainage pathways. Table 8-1 lists buildings, IHSSs, PCB sites, and UBC locations in the Industrial Area that may contribute to contaminant transport in the various drainage pathways. Table 8-1 also lists possible contaminants associated with the identified IHSSs and UBC sites. Buildings in the subbasins may be potential sources of chemical release during an unplanned event. Flow from a spill, leak, or overflow outside a particular building may enter the identified drainage pathway. Inside spills, leaks, or overflows could enter the building foundation drain and be carried to surface water or groundwater. Flow pathways of buildings with foundation drains currently known to lead to a surface water drainage pathway were provided in Table 5-24.

Contaminant migration along the surface water drainage pathways was characterized in the 1989 and 1990 *Surface Water and Sediment Geochemical Characterization Reports* (EG&G 1992a,b). Information from these reports confirms transport pathways set forth in the conceptual site model. Findings of the studies were discussed in Section 5.3.

Proposed actions for surface water monitoring programs are set forth in Section 5.7. Continued monitoring at Industrial Area surface water sampling locations at outfall, culvert, and subbasin locations will allow monitoring of current releases and assist in the identification of releases from unplanned events in the Industrial Area. The establishment of additional surface water sampling locations at areas of drainage base

TABLE 8-1
Industrial Area IM/IRA/DD
Potential Sources of Contamination Contributing to Surface Water Drainage Pathways

Drainage Pathway	Buildings	IHSSs and Possible Contaminants Associated with the IHSS		PCB Sites	Under-Building Contamination
Drainage Pathway # 1					
	122	116.1	oil, solvents, HCs, low-level rads	Site 5	122
	123	116.2	U, UO_2, carbon tetrachloride, HNO_3, chlorinated hydrocarbon-HCs solvents, Be	Site 7	123
	124	117.3	oil contaminated with U	Site 8	125
	125	120.1	polyester resin peroxide catalyst materials, solvents, Pu, U, Am	Site 9	441
	221	120.2	solvents, resins, Pu, U	Site 12	442
	224	121	U238, U235, Cr(+6), Be, Fe, iodine, Pu, NO2, acids, bases, phosphate, tritium	Site 13	
	275	122	NO_2 and radionuclides	Site 14	
	439	129	fuel oil, diesel, compressor oil, solvents, 1,1,1-TCA, Hg, Cd, Cu, Pb	Site 15	
	440	136.1	acidic or lithium dichromate, lithium chromate, Cr(+6), depleted U	Site 16	
	441	136.2	acidic or lithium dichromate, lithium chromate, Cr(+6), depleted U	Site 17	
	442	147.2	Be, U	Site 18	
	443	148	NO_2-bearing wastes and low level radioactive waste with NO_2	Site 36	
	444	152	No. 6 fuel oil		
	445	157.1	U (depleted and enriched), Be, solvents		
	447	157.2	U, Be, chlorinated hydrocarbon solvents, carbon tetrachloride, hydraulic oil, lithium, chromium, Pu		
	452	160	U, Pu, PCBs, PCE, CS_2, TCE		
	463	161	Am, Pu, U, oil, PCE, VOCs		
	463	162	VOCs, radionuclides, Be, Fe, Cr, nitric acid, HCl, fluoride		
	662	164.1	Pu		

TABLE 8-1
Industrial Area IM/IRA/DD
Potential Sources of Contamination Contributing to Surface Water Drainage Pathways

Drainage Pathway	Buildings	IHSSs and Possible Contaminants Associated with the IHSS		PCB Sites	Under-Building Contamination
Drainage Pathway #1 (cont'd.)					
	663	164.2	U		
	664	164.3	U		
	668	177.0	waste oils, paint, paint solvents, low-level radioactive waste		
	865	178	waste oil containing VOCs and low-level radioactive waste		
	866	179	waste oil, chlorinated solvents, Be		
	880	180	waste oils with contaminated solvents, U		
	883	182	waste oils, chlorinated solvents, Be, UO_2 (depleted)		
	884	187	sulfuric acid, lime		
	886	189	nitric acid, sodium bicarbonate		
	888	190	sodium hydroxide		
	889	191	hydrogen peroxide		
		193	low concentration of amines		
		204	U		
		205	nitric acid, hydrofluoric acid, ammonium salts		
		207	Acids – HPO_4, H_2SO_4, CrO_3 (chromium trioxide), with CN, Cd, Cr, Pb, Ag, As, U, Am, H_3		
		208	Nitric acid with Ag, sodium fluoride, sodium fluoride solution, plating acids (HCl, HNO_3, HF) with plating solution, Cd, CN, nickel sulfate, developer, fixer		
		211	Not available		
		213	pondcrete, nitrate, low-level radiation, VOCs		
		217	Not available		

TABLE 8-1
Industrial Area IM/IRA/DD
Potential Sources of Contamination Contributing to Surface Water Drainage Pathways

Drainage Pathway	Buildings	IHSSs and	Possible Contaminants Associated with the IHSS	PCB Sites	Under-Building Contamination
Drainage Pathway # 2					
	223	117.1	U	Site 3	776
	333	117.2	radioactivity	Site 10	777
	334	118.2	carbon tetrachloride, organic solvents	Site 11	778
	549	121	U238, U235, Cr(+6), Be, Fe, iodine, Pu, NO_2, acids, bases, phosphate, tritium	Site 24	991
	551	123.1	U solvents, oils, Be, nitric acid, hydrochloric acid, fluoride	Site 25	
	552	123.1	U solvents, oils, Be, nitric acid, hydrochloric acid, fluoride	Site 26	
	553	123.2	U, solvents, oil, Be, nitric acid, hydrochloric acid, fluoride	Site 30	
	554	147.1	NO_2, U, Pu, Be, acids, solvents		
	555	150.4	Pu		
	558	150.5	Not available		
	559	150.7	Pu		
	561	157.2	U, Be, chlorinated hydrocarbon solvents -- carbon tetrachloride, oil, chromium		
	564	158	low-level U		
	707	169	hydrogen peroxide		
	708	172	carbon tetrachloride, oil, TCE, U, Pu		
	750	173	acetone, PCE, TCA, radionuclides		
	776				
	777				
	778				

TABLE 8-1
Industrial Area IM/IRA/DD
Potential Sources of Contamination Contributing to Surface Water Drainage Pathways

Drainage Pathway	Buildings	IHSSs and Possible Contaminants Associated with the IHSS		PCB Sites	Under-Building Contamination
Drainage Pathway #2 (cont'd.)					
	965	175	waste oils, thinners, metals, radionuclides		
	968	184	radionuclides		
	980	185	1,1,1-TCA		
	984	192	ethylene glycol		
	985	194	Not available		
	987	197	PCBs		
	988	210	waste oil, solvents, paints, thinner, grease, gasoline, diesel, fiberglass resins and catalysts		
	989	214	pondcrete, low-level radioactive and hazardous wastes		
	990				
	991				
	993				
	995				
	996				
Drainage Pathway # 3					
	111	117.1	U	Site 4	None
	112	118.1	carbon tetrachloride or TCE	Site 6	
	113	121	U238, U235, Pu, NO_2, acids, bases, Cr(+6), Be, Fe, iodine, phosphate, tritium	Site 20	
	115	124.1	nitrates, Pu, U	Site 21	
	119	126.1	nitrates, Pu, U, organics, inorganics	Site 22	

TABLE 8-1
Industrial Area IM/IRA/DD
Potential Sources of Contamination Contributing to Surface Water Drainage Pathways

Drainage Pathway	Buildings	IHSSs and	Possible Contaminants Associated with the IHSS	PCB Sites	Under-Building Contamination
Drainage Pathway #3 (cont'd.)					
	127	126.2	nitrates, Pu, U, organics, inorganics	Site 23	
	128	127	nitrates, Pu	Site 24	
	262	131	Pu, U	Site 28	
	331	132	radionuclides, detergent	Site 31	
	333	134	lithium, Na, Ca, solvents, graphite, Mg	Site 33	
	334	135	tritium	Site 34	
	335	137	chromates		
	367	139.1N, 139.1S	NaOH, KOH, Cr, alpha (radionuclides), HCl, HF, HNO_3, H_2SO_4		
	371	139.2	hydrofluoric acid		
	373	144	radioactivity		
	374	146.1	Pu, U, acids, caustics		
	376	150.2	Pu		
	516	150.3	radioactivity, nitrates, chemicals		
	517	150.3	radioactivity, nitrates, other chemicals		
	518	150.5	Not available		
	551	150.7	Pu		
	559	151	diesel fuel		
	561	156.1	radioactivity		
	701	159	radioactivity		
	712	163.2	radioactivity		

TABLE 8-1
Industrial Area IM/IRA/DD
Potential Sources of Contamination Contributing to Surface Water Drainage Pathways

Drainage Pathway	Buildings	IHSSs and Possible Contaminants Associated with the IHSS		PCB Sites	Under-Building Contamination
Drainage Pathway #3 (cont'd.)					
	713	170	waste oils, spent solvents		
	770	171	diesel fuel, gasoline and combustion products, Mg, waste solvents		
	771	172	carbon tetrachloride, oils, TCE, U, Pu		
	774	174	waste paints and thinner, freon-based or oil-based coolant, metals, NO_2, radionuclides		
	776	181	oils, solvents, coolants, low-level radionuclides		
	777	186	uranium nitrate, Pu, Am, Cl, SO_4, oakite		
	778	188	nitric acid, hydrochloric acid, heavy metals		
	790	206	tritium		
		212	Not available		
Drainage Pathway # 4					
	130	None	Not applicable	None	None
	131				
Drainage Pathway # 5					
	440	116.1	oil, solvents, hydrocarbons, low-level radionuclides	Site 9	440
	447	121	U238, U235, Cr(+6), Be, Fe, iodine, Pu, NO_2, acids, bases, phosphate, tritium	Site 17	447
	448	136.1	acidic or lithium dichromate, lithium chromate, Cr(+6), U	Site 18	881
	451	147.2	Be, U	Site 19	883
	460	157.2	U, Be, chlorinated hydrocarbon solvents, carbon tetrachloride, oils, lithium, chromium, Pu		887
	850	161	Am, Pu, U, oil, PCE, VOCs		

TABLE 8-1
Industrial Area IM/IRA/DD
Potential Sources of Contamination Contributing to Surface Water Drainage Pathways

Drainage Pathway	Buildings	IHSSs and Possible Contaminants Associated with the IHSS		PCB Sites	Under-Building Contamination
Drainage Pathway # 5 (cont'd.)					
	881	164.1	Pu		
	883	177	waste oils, paint and paint solvents, low-level radionuclides		
	885	178	waste oil containing VOCs and other hazardous wastes, low-level radioactivity		
	887	204	U		
		205	nitric acid, hydrofluoric acid, ammonium salts		
		208	nitric acid, Ag, sodium fluoride, sodium fluoride solution, HCl, nitric acid, hydrofluoric acid, Cr, Cd-CN solution, nickel sulfate, developer and fixer		
		217	Not available		
Drainage Pathway # 6					
	964	101	Liquids and sludges: Pu, Am, tritium, U, Be, Cd, Cr, Ni, nitrates; soil: metals, K, Na, Mg, radionuclides; groundwater: nitrates and radionulides; seeps: NO_2, metals, rads, organics	None	None
		176	mineral spirits, waste oil, VOCs, metals, low-level radioactivity, nitrates		
Drainage Pathway #7					
	207	101	Liquids and sludges: Pu, Am, tritium, U, Be, Cd, Cr, Ni, nitrates; soil: metals, K, Na, Mg, radionuclides; groundwater: nitrates and radionulides; seeps: NO_2, metals, rads, organics	Site 29	779
	215	121	U238, U235, Cr(+6), Be, Fe, iodine, Pu, NO2, acids, bases, phosphate, tritium		
	705	138	Cr, radionuclides		
	706	144	radionuclides		

TABLE 8-1
Industrial Area IM/IRA/DD
Potential Sources of Contamination Contributing to Surface Water Drainage Pathways

Drainage Pathway	Buildings	IHSSs and Possible Contaminants Associated with the IHSS		PCB Sites	Under-Building Contamination
Drainage Pathway #7 (cont'd.)					
	729	150.6	radionuclides, oil		
	777	150.8	radionuclides		
	779	163.1	radionuclides		
	782				
	788				
	928				
	966				

flow and subbasin boundaries and use of OU characterization data as they become available will allow better identification of existing contaminant transport pathways in the Industrial Area and will aid in the prevention of contaminant migration in an unplanned event. The establishment of baseline quality conditions will assist in source delineation along the various drainage pathways.

8.3.3 Air

Air was identified as both a primary and secondary transport medium in the conceptual site model. As shown in the conceptual site model, contaminants may be released to the ambient atmosphere through volatilization from contaminated soils, migration of contaminated soils or sediment as fugitive dust, volatilization of contaminants from surface water, or release of routine effluents at process building exhaust stacks and ventilation systems. The RFP air monitoring programs address continuous stack and gaseous effluents and ambient air monitoring of radioactive and nonradioactive particulates. The four subprograms of the RFP air monitoring system were described and evaluated in Section 6.2. OU-specific monitoring is also conducted, if applicable, during environmental investigations at OUs at RFP. Meteorological monitoring at the facility aids in assessing contaminant migration. Other air monitoring-related activities which can be related to the conceptual site model include air dispersion models and Air Pollution Emission Notices (APENs) reporting.

HEPA filter plenums are located in buildings where fabrication and recovery operations formerly occurred. These operations have stopped, reducing the likelihood of atmospheric release of radiological particulates and beryllium from this former potential source. However, an atmospheric release of residual material in building stacks or ventilation systems could occur during an unplanned event, or as a result of waste handling or internal operation and maintenance activities. Sources of volatile emissions other than those specifically identified in the conceptual site model may include painting and maintenance operations, and vehicle emissions. Such releases would be included as part of baseline conditions (discussed in Section 9.0).

Sources of airborne contaminants in the Industrial Area may include historically contaminated areas such as IHSSs or PCB sites that have surface soil contamination, or VOCs in the vadose zone and building exhaust stacks and ventilation systems. Contaminants may be released as fugitive dust from vehicular traffic or as a result of soil particle entrainment during occurrences of high wind. Contaminants may also be released directly to the atmosphere by volatilization from soils or with building effluents. Chemical classes that may be released from sources in the Industrial Area include organic solvents, pesticides, inorganics, and radionuclides.

An onsite study of the air transport pathway has been undertaken at RFP. A portable wind tunnel, as described in *Air/Superfund National Technical Guidance Study Series, Volume II, Estimates of Baseline Air Emissions At Superfund Sites* (EPA 1990) was used by EG&G's EPM/Air Quality Division to characterize the potential for dispersion of plutonium-contaminated sediments and soils. Data from the air sampling program and the special wind tunnel applications were used as the basis of a resuspension characterization study at OU3 designed to improve data collection and sensitivity. Data collected are intended to improve air pathway analysis at the site.

Ventilation/filtration exhaust systems in place at all production and research facilities control atmospheric releases from buildings in the Industrial Area. Radioactive and nonradioactive particles are contained by glovebox and filter plenum systems. Chemical emissions are controlled by scrubbers and filters. These and other types of engineering design controls eliminate the concern for airborne transport of contaminants from interior building sources.

Existing monitoring and proposed actions for inclusion of additional baseline constituent determination monitoring will adequately monitor any potential atmospheric releases from the Industrial Area. In addition, the *Plan for Prevention of Contaminant Dispersion* (PPCD) (DOE 1991) developed to monitor windblown constituents that might be released during activities at RFP (particularly OU-specific environmental investigations) will ensure that releases are controlled during ongoing remedial or D&D activities. The plan establishes control measures to mitigate dust emissions and a monitoring program that evaluates the effectiveness of such measures. The PPCD will help prevent unplanned emissions from the Industrial Area by providing early detection of releases to the atmosphere and implementation of control measures.

8.3.4 Incidental and Foundation Drain Waters

The primary source of incidental water at RFP is stormwater, but it can also originate as groundwater. Incidental waters may accumulate in a number of source areas such as excavation sites, pits, trenches, or ditches; water collected in secondary containments or berms, process waste valve vaults, electrical vaults, steam pits, other utility pits, telephone manholes, foundation drains, and fire suppression system discharges; and the natural collection of precipitation and stormwater runoff in excavations, pits, trenches, ditches, depressions, or other areas. The conceptual site model focuses on incidental waters originating from groundwater that collect in building foundation drains and building sumps. Buildings in the Industrial Area may contain foundation drains, sumps, valve vaults, and other structures that intersect the groundwater table.

Incidental waters may be a primary source of contamination to the groundwater, allowing transportation of contaminants from discharges and overflows or groundwater recharge at the foundation drain location. The waters could potentially become contaminated from flow contact with groundwater or groundwater recharge at historical release areas, past waste disposal sites, UBC locations, or from overflows from an unplanned event inside a building.

As discussed in Section 7.3, management or monitoring programs that are associated with incidental waters include the surface water and stormwater programs and the program presented in *Control and Disposition of Incidental Waters* (CDIW) (EG&G 1993). The latter program does not include management of foundation drain or building sump waters as discussed previously; however, most known foundation drain flows are monitored before reaching the RFP detention ponds.

Figure 7-1 indicates locations of foundation drains, sumps, and vaults in buildings in the Industrial Area that may allow contaminant transport in incidental waters. Most of the foundation drains discharge into storm drains or at outfalls located along surface water drainage pathways. Table 7-1 lists the location of drain outfalls and foundation drains most likely to be associated with potential sources of contamination. Flow paths for each building foundation drain in the Industrial Area were identified in Table 5-24 and in Figures A-1 through A-15 in Appendix 7.1.

The building outfalls listed in Table 7-1 were evaluated to identify the surface water drainage pathway that may be affected by outfall discharges, possibly allowing contaminant transport. Surface water drainage pathways that may be affected by foundation drain outfalls include Pathways 1, 2, 3, 5, and 7. Table 8-1 lists the buildings along these pathways. Sampling of surface drainages and surface water transport pathways are discussed in Section 8.3.2. Some of the foundation drain outfall locations are not field-verified, and the potential surface water contaminant transport association cannot be made at this time. Groundwater monitoring was also considered in assessing whether releases from incidental water sources are adequately monitored. Groundwater sampling and groundwater transport pathway sampling are discussed in Section 8.3.1.

Results of aperiodic sampling of foundation drains and building sumps presented in Table 7-2 indicate that the incidental waters from the sampled sumps and foundation drains contain some contamination, confirming the likelihood of contaminant migration in incidental waters from these sources. Incidental waters occurring at excavation sites, pits, trenches, or ditches or collected in secondary containments or berms may become contaminated if they occur in historically contaminated areas such as IHSSs or PCB sites where soil contaminants may leach into the collected water. Incidental waters that collect in process waste valve vaults, electrical vaults, steam pits, other utility pits, telephone manholes, building foundation drains, and building sumps may become contaminated from groundwater recharge or from flow contact with contaminated groundwater in areas where groundwater contamination exists. An unplanned event such as a fire, spill, leak, or overflow could also lead to contamination of incidental waters.

The Surface Water Division's flow diagrams for the management and disposition of foundation drain and utility pit discharges are presented in Figures 7-4 and 7-5. The diagrams generally indicate flow routing of incidental waters from foundation drain and utility pit discharges. In some cases, water is routed to the waste water treatment plant, Building 374, or other locations for treatment, thereby eliminating the concern for contaminant transport in those incidental waters. More often, incidental waters discharge at outfalls in or near the Industrial Area. These discharges may flow to one of the surface water drainage pathways (Table 5-24), possibly contaminating soils in the area or reinfiltrating through the soil to the upper hydrostratigraphic unit.

Proposed actions set forth in Section 7.6 allow better identification of transport pathways associated with incidental waters in the Industrial Area. Enhancements to current surface water and groundwater monitoring programs and use of OU characterization data will also improve the assessment of potential migration pathways from foundation drains and building sumps. Expansion of the CDIW sampling program to include more sampling locations and analytes, as suggested in earlier sections, will allow more adequate detection of releases associated with incidental waters in the Industrial Area.

8.4 SUMMARY

The conceptual site model has been used in conjunction with the media-specific evaluations of existing monitoring in the Industrial Area to assist in the identification of data gaps and presentation of proposed actions for additional monitoring. This information has also been used to formulate a future conceptual site model in anticipation of D&D activities (presented in Section 10.0). Because the number of sources where contaminants could be released within the Industrial Area is so extensive, general source types were grouped together for consideration in the conceptual site model. COPCs and COIs were identified for the various media based on up-to-date chemical information obtained for the Industrial Area. The COPC and COI lists provide a comprehensive list of contaminants that currently exist or that could potentially be released during an unplanned event. These constituents may be transported in the environment by way of the release mechanisms and transport pathways identified in the conceptual site model.

8.5 REFERENCES

EG&G Rocky Flats, Inc. 1993 (September). *Control and Disposition of Incidental Waters.*

EG&G Rocky Flats, Inc. 1992a (April). *1989 Surface Water and Sediment Geochemical Characterization Report.*

EG&G Rocky Flats, Inc. 1992b. *1990 Surface Water and Sediment Geochemical Characterization Report.*

EG&G Rocky Flats, Inc. 1992c. *Historic Release Report, the Rocky Flats Plant, Golden, Colorado, Environmental Restoration Program.*

U.S. Department of Energy. 1991 (November). *Plan for Prevention of Contaminant Dispersion* (PPCD). Final. Rocky Flats Plant. Golden, Colorado.

U.S. Environmental Protection Agency. 1990 (August). *Air/Superfund National Technical Guidance Study Series, Volume II, Estimates of Baseline Air Emissions At Superfund Sites.* EPA-450/1-89-002a.

U.S. Environmental Protection Agency. 1989. *Risk Assessment Guidance for Superfund-Volume 1, Human Health Evaluation Manual (Part A).*

U.S. Environmental Protection Agency. 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA.*

(intentionally blank)

Section 9.0

9.0 DECONTAMINATION AND DECOMMISSIONING ACTIVITIES

The objectives of this section of the IM/IRA/DD are to summarize the phases of D&D; describe the methodology proposed to establish a baseline data set, warning limits, and control limits; present an evaluation of potential monitoring technologies; outline the preprogrammed response during verification monitoring; and summarize the current emergency response procedures. This information was developed by reviewing information about (1) the D&D planning process, (2) statistical programs and methodologies, and (3) emergency response capabilities. Subject matter experts at RFP and other selected DOE facility personnel were identified and interviewed to compile this information. The information presented in this section is current as of January 1994.

9.1 DESCRIPTION OF DECONTAMINATION AND DECOMMISSIONING ACTIVITIES

The DOE D&D process is the sequence of events that occurs in the disposition of surplus DOE facilities. The D&D process will be conducted by the Office of Environmental Restoration (EM-40) in compliance with DOE Order 5820.2A, Chapter V, "Decontamination of Radioactively Contaminated Facilities," dated September 26, 1988. This chapter identifies D&D requirements, principal planning documents, and policies; describes responsibilities of DOE Headquarters and field organizations; and provides additional sources of information (DOE 1994). It is not the purpose of this decision document to define D&D activities. It is intended to provide a general description of the types of activities associated with the D&D process and to illustrate the linkage and coordination with the IM/IRA.

The nature and extent of D&D is still under development. Therefore, detailed written plans for RFP-specific D&D activities have not been formulated. In general terms, D&D

may entail the removal of fixed materials, equipment, and facilities, including buildings. Examples of D&D activities include the following:

- Remove fixed equipment, piping, and tanks.
- Retrofit equipment for future use.
- Dismantle and remove ventilation systems including glove boxes, ducts, and stacks.
- Modify or renovate buildings.
- Dismantle or demolish buildings.
- Excavate underground equipment, piping, and foundations.

While specific details of the D&D process are still under development, the approach will be multiphased and complex. The basic approach to D&D may vary among facilities, but it is likely to follow similar tenets for any DOE facility. The D&D process consists of seven basic components or phases. Table 9-1 summarizes the D&D process and the Industrial Area IM/IRA link to this process. As discussed in Section 1.0, the type and level of D&D activity will vary throughout the program. The phases described below represent the most comprehensive D&D activities. Not all phases will be applicable to all activities. Because D&D activities are not currently defined, the verification monitoring program will evolve as more information becomes available.

9.1.1 Phase I - Transition

Phase I begins with the termination of operations at a facility and includes the establishment of a surveillance and maintenance program and ends with the completion of safe shutdown and transfer of the facility to Environmental Restoration EM-40 (DOE 1994). Before the transfer is initiated, EM-40 requires preliminary characterization and hazards analysis; an effective surveillance and maintenance program; input into the EM-40 budget cycle (up to three years before transfer); and compliance with EM-40

TABLE 9-1
Industrial Area IM/IRA/DD
Phases of Decontamination and Decommissioning at Rocky Flats Plant

FINAL

Phase I **Transition**	**Phase II** **Project Preparation**	**Phase III** **Environmental Review, Subproject Baseline Development** **Facility Characterization**	**Phase IV** **D&D Engineering Implementation Planning**	**Phase V** **Decommissioning Operations**	**Phases VI & VII** **Closeout and Verification; Postoperations Activities**
D&D					
• Terminate Operations • Waste Operations and Material Consolidation • Deactivation • Decontamination Ready	• D&D Project Management Plan • Master List of Surplus Facilities • Five-Year Plan • Master D&D Schedule • Master D&D Budget • Activity Data Sheets • Regulatory Oversight Approach • Technology Evaluation & Development • Waste Management Strategies • Release & Disposal Criteria • QA Program Plan • Development of Organizational Interfaces	• Facility Characterization • Safety Analysis Review • Subproject Management Plan • Engineering Alternatives Analysis • Subproject Scope Development • Subproject Baseline Schedule • Work Breakdown Structure • Regulatory Analysis • Environmental Review • Subproject QA Plan • Management Implementation Plan • NEPA Documentation	• Subproject Decommissioning Plan • Engineering Design • Emergency Response Plan • Facility Waste Management Plan • Facility Release and Disposal Criteria • Cost Estimate • Procurement Plan • Site Preparation • O&M Procedures • Training Plan • Contractor Selection	• D&D Operations • Waste Management Operations • Status Reports • Procedure Implementation • QA Audits • Develop and Maintain D&D Database • Contract Management	• Radiological Surveys • Chemical Surveys • Lessons Learned Report • Postclosure Care • Independent Verification of release
IM/IRA Activities					
	• Identification of COPCs • Identification of Media-Specific Pathways • Development of Monitoring Criteria	• Design of Verification Monitoring Plan • Installation of Verification Monitors • Establishment of Baseline Conditions	• Verification Monitoring • Performance Reports • Investigation of Detected Contaminants • Response to Detected Releases	• Reestablish Baseline Conditions • Closeout/Completion Report • Monitor Removal	

Legend: D&D = decontamination and decommissioning; QA = quality assurance; COPC = constituents of potential concern; NEPA = National Environmental Policy Act; O&M = operations and maintenance

Source: U.S. Department of Energy, Office of Environmental Restoration (EM-40) Decontamination and Decommissioning Guidance Document, Draft 3, January 14, 1994 (DOE 1994).

(wpf) h:\wp\flats\im-ira\pd\tables\tab9-1.wpf 11/07/94 acceptance criteria. This phase ends with the execution of a Memorandum of Agreement (MOA) that transfers administration of the site to EM-40 (DOE 1994). The transition process involves removing process materials, product, equipment, and waste from RFP facilities in preparation for D&D. These activities are performed according to written plans and procedures. Potential releases will be detected and mitigated by following strict operational procedures. Examples of transition activities are (1) pumping chemicals from a tank into drums, (2) solidifying materials, (3) removing the drums from the building, and (4) storing them in an engineered storage area.

Additionally, engineering controls for transition and D&D activities will be installed and relied on to prevent releases. Transition activities do not require verification monitoring because known materials or wastes will be handled under controlled conditions and undetected releases are unlikely. For example, removal of a drum containing excess solvent from a building does present a spill risk but little risk of an undetected release. The personnel removing the drum will be trained to perform the task and to implement the spill response procedures developed for transition activities.

Transition consists of four stages according to the *Rocky Flats Plant Transition Plan, Report to Congress* (DOE 1992). The stages are not mutually exclusive; multiple concurrent activities are possible, which incorporate aspects of more than one stage.

9.1.1.1 Stage I - Limited Operations or Continued Nonnuclear Production

The ongoing activities in the buildings include those essential to the operation and maintenance of safety and safeguard-related systems. The end of this stage will be governed by the building mission. When a facility is declared to be surplus status, it will be recommended for transition to Stage II.

9.1.1.2 Stage II - Waste Operations and Material Consolidation

In this stage of the process, facilities that have been declared to be surplus status are shifted toward deactivation. The characterization, stabilization, packaging, consolidation, removal, and transportation of SNM and other nuclear material, hazardous material, and classified matter are key activities included in this transition stage. The primary objective of this stage is to remove major hazards and reduce overall safety hazards (DOE 1992).

9.1.1.3 Stage III - Deactivation

The major deactivation tasks are (1) development and implementation of a cleanup plan in accordance with Environmental Restoration and Waste Management criteria and standards, (2) completion of a final building characterization, and (3) development and implementation of effective surveillance programs to ensure the maintenance of appropriate safeguards and environmental systems (DOE 1992).

9.1.1.4 Stage IV - Decontamination-Ready

A building is considered decontamination-ready when the conditions of the preceding three stages have been satisfied. The following factors, originally listed in the transition plan (DOE 1992), will be the basis for the criteria to accept the facilities for decontamination, if applicable:

- The facility has been formally declared to be surplus status for defense programs.

- All Defense Program missions have been transferred or addressed.

- Usable equipment has been removed and unnecessary maintenance discontinued.

- Verification that the following vital safety systems (VSS) are functional:

  - fire detection and suppression;
  - life, safety, and disaster warning (public address);
  - emergency power;
  - heating, cooling, and ventilation; and
  - radiation monitoring.

- Control systems for the VSS are operational.

- SNM has been removed.

- Classified parts, fixtures, and documents have been removed.

- Hazardous materials and chemicals have been inventoried and removed.

- Physical, chemical, and radiological properties of buildings have been characterized.

- Readily removable contamination has been cleaned up.

- Nonessential equipment has been locked out and tagged out.

- Contaminated equipment and systems have been isolated.

- An environmental compliance assessment has been completed.

- All corrective actions and audit findings have been closed out.

- Historical data on unplanned occurrences at buildings and facilities have been compiled.

- All available drawings, specifications, and procedures have been compiled.

- Existing monitoring data have been compiled.

- Environmental assessment requirements have been identified.

- Security systems are operational as required.

- Funding requirements have been identified and requested.

Surveillance and maintenance following Stage IV will continue until physical D&D has begun or the building has been designated for other uses.

All work performed at RFP is subject to various administrative controls that are designed to protect (1) health and safety of personnel and the public and (2) the environment. It is anticipated that buildings and remaining equipment will have been well characterized and hazards assessed during transition. This information will be useful for developing the D&D analogs to the Transition Standards Identification Program (TSIP) and Activity Based Planning (ABP) Process Activity Control Envelopes (ACE) described in the transition plan (DOE 1992).

9.1.2 Phase II - Project Preparation

Surveillance and maintenance continues during this phase. The principal planning activities are preparing the D&D Project Management Plan and establishing the technical cost and schedule baselines for the project. The Project Management Plan also establishes the initial position with respect to compliance with environmental statutes and regulations (DOE 1994). For example, a DOE position on National Environmental Policy Act compliance and whether an Environmental Impact Statement (EIS) or Environmental Assessment (EA) is to be prepared, will be stated. Portions of the Phase III environmental review may be initiated at this time. During this phase, personnel will also begin to define waste management strategies, develop a quality assurance program for the work to be done, and define organizational interfaces. This phase ends with the approval of the Project Management Plan and the beginning of more detailed D&D planning.

9.1.3 Phase III - Environmental Review, Subproject Baseline Development, and Facility Characterization

During Phase III, the site and facility are characterized and a safety analysis and risk assessment are completed. Engineering work is performed to define and estimate the D&D alternatives, and other engineering studies are performed to support the preparation and completion of the appropriate NEPA documentation. The key objective of this phase is to reach a decision that defines the scope and end condition of the D&D project. This objective is performed by developing a subproject scope and a baseline schedule. The subproject Work Breakdown Structure (WBS) is also developed at this time. A regulatory analysis and the Environmental Review Process are begun in this phase. Candidate decommissioning alternatives will be evaluated and selected based on the results of the environmental review (DOE 1988). This phase ends with approval of the D&D alternative and approval to start detailed engineering (DOE 1994).

9.1.4 Phase IV - Decontamination and Decommissioning Engineering and Implementation Planning

When the preferred approach is selected in Phase III and the D&D alternative is approved, preparation of the Subproject Decommissioning Plan can begin. This phase includes the development of the Engineering Design, Emergency Response Plan, Facility Waste Management Plan, Facility Release and Disposal Criteria, and the Procurement Plan. The latter part of this phase includes acquiring the performing contractor, preparing procedures and manuals, training personnel, and making other necessary preparation by the contractor. This phase ends with the successful completion of the Readiness Review and approval to start decommissioning field activities (DOE 1994).

9.1.5 Phase V - Decommissioning Operations

This phase includes the fieldwork to execute the Decommissioning Plan. Important components of this phase include the development of status reports, implementation of procedures, conducting QA audits, input and maintenance of a D&D database, and contract management (DOE 1994).

9.1.6 Phase VI - Closeout and Verification

During this phase, the field office prepares or has prepared the close-out documentation and an independent verification contractor, selected by the Headquarters Program Manager, makes the necessary reviews and field surveys to verify that the specified end conditions have been met. These activities may include Radiological Surveys, Chemical Surveys, and Lessons Learned Reports. Supporting documentation may be provided by the Industrial Area IM/IRA verification monitoring program personnel. This phase ends with approval of the close-out verification or record of completion (DOE 1994).

9.1.7 Phase VII - Postoperations Activities

If appropriate for the project, this phase will constitute long-term surveillance and monitoring or other institutional controls to carry out the final disposition decision of the project.

9.1.8 IM/IRA Link to Decontamination and Decommissioning Activities

An important component of D&D verification monitoring is the communication link between the D&D project and the Industrial Area IM/IRA. This link is important, because it is necessary to identify D&D schedules and activities for specific buildings and areas in a time frame sufficient to allow for implementation of Industrial Area IM/IRA proposed actions. The D&D project and the Industrial Area IM/IRA have a programmatic relationship that will require a ready information exchange between the two projects. The IM/IRA for the Industrial Area does not define or drive D&D activities; rather, IM/IRA personnel will use data and information collected by D&D personnel to design the appropriate verification monitoring system for a specific D&D activity.

Although much of the D&D planning process remains undeveloped, this Decision Document requires that D&D planning procedures include a communication component between the Industrial Area IM/IRA management team and the D&D management team. Communication links will occur early enough in the process to allow for proper planning, budgeting, and implementation of the verification monitoring required for specific D&D activities. Communication will occur throughout the D&D process and will most likely begin during Phase II - Project Preparation or Phase III - Environmental Review, Subproject Baseline Development, and Facility Characterization.

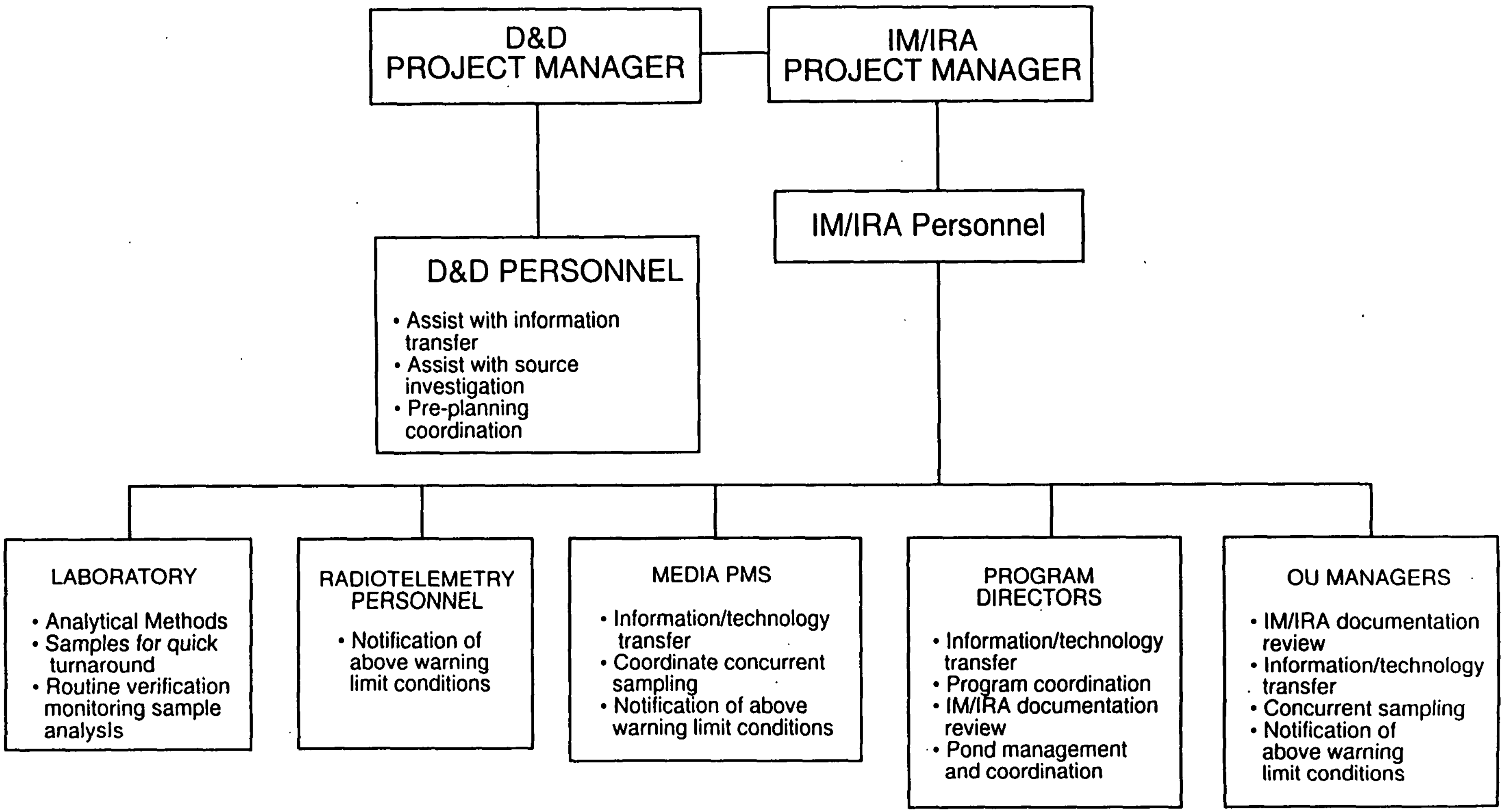
Figure 9-1 presents the communication organization chart for the link between D&D and IM/IRA activities in the Industrial Area. The organization chart also outlines the communication flow between the IM/IRA project manager and the project managers for the various subcomponents of the program. IM/IRA personnel will attend D&D pre-planning meetings and weekly meetings during the activity to obtain information and generate procedural discussions to meet the objectives of both programs. D&D personnel will be enlisted to assist with contaminant source investigations, if required, during verification monitoring.

The IM/IRA team will coordinate with the laboratory to evaluate analytical methods used to analyze verification monitoring samples and also arrange for quick turnaround results for specific sampling events, if required. The EG&G media project managers and IM/IRA personnel will communicate on a regular basis to assure that analytical results are available for evaluation, coordinate concurrent sampling, and exchange notification of above warning limit conditions. This communication link will include information transfer between the existing programs and the verification monitoring program. EG&G program directors will be updated throughout the activities to maintain programmatic relationships and support the preparation of IM/IRA documentation. The EG&G OU managers will also be included in the communication link to assure proper dissemination of information.

The communication link between D&D, IM/IRA, and other existing programs is crucial to the verification monitoring program. The primary objective of these links is to ensure that all applicable information is evaluated to detect potential releases from D&D activities in an effective and efficient manner. Reporting requirements associated with the verification monitoring program are described in Sections 9.1.8.3 and 9.1.8.4. An

FIGURE 9-1
INDUSTRIAL AREA IM/IRA/DD
PREPROGRAMMED RESPONSE
ADMINISTRATIVE LINKAGE

COMMUNICATION ORGANIZATION CHART



h:\wp\flats\graphics\fig-al (aldus) 6/27/94 annual status report will be submitted to the agencies on the anniversary of the approval of the Final IM/IRA/DD. Potential IM/IRA actions that correspond to D&D Phases III through VII, as outlined in Table 9-1, are described in the following subsections.

9.1.8.1 Phase III - IM/IRA Actions

During this phase when the Subproject Scope and Activity Baseline Schedule are developed, the Industrial Area IM/IRA will focus on planned site-specific D&D activities. When the general D&D activities have been defined and scheduled, the IM/IRA verification monitoring program can be implemented. This process begins with the identification of the target COPCs for the building or area undergoing D&D and also identifies media-specific pathways that may require verification monitoring. Monitoring criteria will be established from this information.

9.1.8.2 Phase IV - IM/IRA Actions

Phase IV of the D&D process, D&D Engineering and Implementation Planning, includes the development of several of the D&D operating plans. These plans include the Waste Management Plan, Emergency Response Plan, and the Technical Baseline. IM/IRA activities corresponding to this D&D phase include the design of the verification monitoring program, installation of verification monitors, and the establishment of baseline conditions before beginning D&D activities.

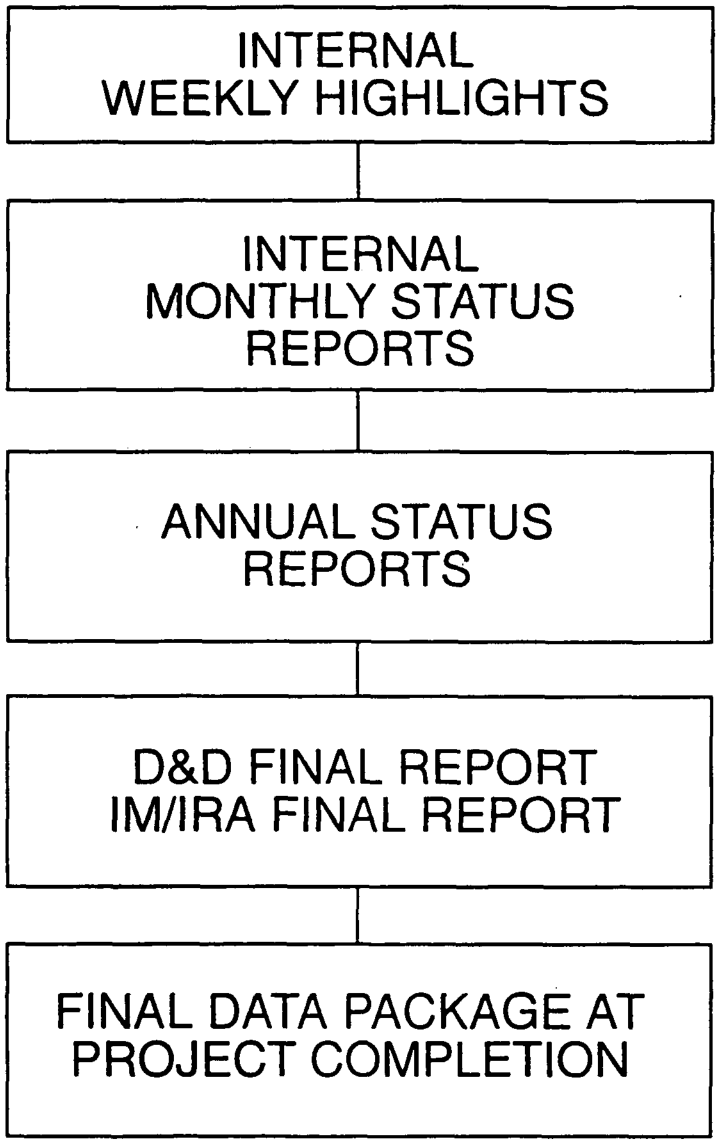
9.1.8.3 Phase V - IM/IRA Actions

Verification monitoring will be ongoing during the implementation of D&D activities. The results of this monitoring will be compiled to meet reporting requirements. These reporting requirements are shown on Figure 9-2. These reports will summarize the verification monitoring system and the results of the sampling and monitoring.

FINAL

FIGURE 9-2
INDUSTRIAL AREA IM/IRA/DD PREPROGRAMMED RESPONSE ADMINISTRATIVE RESPONSE

REPORTING REQUIREMENTS



The reporting requirements for D&D activities are outlined in the *Decontamination and Decommissioning Guidance Document* (DOE 1994). The reporting requirements specified in this guidance document will include documentation of IM/IRA status and results. The weekly highlights report will include a brief summary of the verification monitoring program as discussed in the D&D weekly meetings. The monthly status report will consist of a summary of the weekly highlights and available analytical results. These reports will be distributed to personnel in the appropriate programs to maintain the communication links described previously. As appropriate, EG&G department personnel will assist IM/IRA personnel with meeting these internal reporting requirements. The annual reports will present the status of the verification monitoring program, available analytical results, description of activities and actions, and a summary of conclusions. Reporting requirements will be met for each D&D activity, depending on the length of time required to complete the activity. For example, if an activity will only require a few months to complete, certain reporting requirements may not be applicable.

9.1.8.4 Phase VI and VII - IM/IRA Actions

IM/IRA actions relative to the completion of site-specific D&D activities will include close-out monitoring to reestablish baseline conditions and removal of the verification monitors. The D&D guidance document specifies a D&D final report at project completion. IM/IRA verification monitoring documentation will be provided as either an attachment to this report or will be submitted as a separate report, depending on the availability of a complete IM/IRA data set at the time that the D&D final report is completed.

9.2 DECONTAMINATION AND DECOMMISSIONING MONITORING TECHNOLOGIES ASSESSMENT

The objective of the monitoring technologies assessment was to evaluate monitoring technology in use at RFP and possible applicability of new instrumentation technologies for the proposed verification monitoring program.

Extensive monitoring networks exist at RFP. These networks characterize concentrations of constituents for regulatory compliance and for measurement of environmental protection performance. The existing networks primarily focus on boundary and buffer zone monitoring and are predominantly based on collection of samples for laboratory analysis. This approach maintains state of the art detection levels but is under time constraints because of laboratory turnaround time. The goal of this section is to discuss assessment of technologies that could be used for monitoring air and surface water pathways from D&D activities with an emphasis on real-time monitoring where possible and practical. The evaluation of technology that could enhance existing monitoring techniques is ongoing and will continue as D&D plans are developed. Experience gained during other environmental investigations and during monitoring preceding D&D activities will also be incorporated.

9.2.1 Monitoring Technologies Assessment Approach

This assessment focused on identifying monitoring technologies available for detection of releases from D&D activities, preferably in real-time. The assessment was initiated by holding discussions with personnel at RFP and other DOE facilities involved in operating and upgrading current monitoring systems and with instrumentation vendors. The discussions identified literature regarding current and possible future systems, databases, and technology information transfer programs that were reviewed. Evaluation of existing air and surface water monitoring systems and the strengths and limitations of technology involved in those systems provided an understanding of monitoring capabilities.

A cursory review of new technologies in the R&D stages was also conducted. R&D technologies for real-time monitoring at the environmental levels of radiological and nonradiological parameters in air and surface water do exist. However, these technologies require a more complete evaluation to determine their applicability, cost effectiveness, and reliability.

R&D of new monitoring technologies is an ongoing process that includes the work of both public and private-sector organizations. Within DOE, several organizations are involved in the R&D process, including the Environmental Technologies Group at RFP and the LANL Technology Development group. These organizations as well as manufacturers of equipment currently in use at RFP were consulted to determine the most recent innovations and improvements to existing instrumentation and to learn about new technologies that are under development. Development of innovative technologies must address the problem of providing instrumentation with sufficient sensitivity for environmental use, the difficulty in providing accurate real-time measurements, and the complexities associated with the measurement of radionuclides.

9.2.1.1 Air Monitoring Technologies

Air monitoring programs at RFP emphasize measurement of radioactive contaminants in effluent and ambient air, although some nonradioactive constituent monitoring is performed.

Radiological Emissions. As discussed in Section 6.0, radiological emissions are currently monitored by a three-tier program involving SAAMs, direct counting of TLLA and TLLB contamination in particulates collected from effluent air, and radioisotopic analysis of the particulates. The three components of the program have significant variations in the time required for completion of analyses and sensitivities.

Selective Alpha Air Monitoring. The SAAMs are currently used to provide real-time detection and alarm capability for off-normal or accidental release situations from air stack emissions. These instruments can be used, not only to warn personnel by audible alarm, but also to actuate equipment/corrective measures that may minimize the magnitude of a release. A more complete discussion of SAAMs is presented in Section 6.0. RFP is currently reviewing the air emissions programs for possible monitoring improvements.

SAAMs are sensitive at occupational exposure levels to specific alpha particle energies that correspond to plutonium-239/240. No other instrumentation was determined to be currently available for direct real-time air monitoring of alpha activity at environmental levels.

Newer SAAMs, which are available, offer improved performance over the current instruments in use at the RFP. Instrument improvements are related to the particulate collection efficiency and sensitivity. In general, the sensitivity of this method of radioactivity detection at environmental levels is limited because of interference by short-lived alpha activity (i.e., radon-222 and thorium) emitted from naturally occurring radionuclides.

The SAAM instruments currently used for continuous detection of alpha emitting radioactive aerosols at RFP may be adequate for air-duct emissions monitoring during D&D monitoring activities. However, newer, improved instruments will continue to be evaluated to determine possible upgrades. In addition, portable SAAMs are suitable for ambient air monitoring at elevated occupational levels adjacent to D&D activities. Portable SAAMs are available for monitoring ambient alpha particle releases both indoors and outdoors. Portable SAAM instrumentation is not suitable for monitoring at the Industrial Area perimeter because of the low sensitivity of the instrument. SAAM equipment for monitoring ambient air will be located as close as possible to the D&D activity to decrease the influence of air dispersion and increase the ability to detect alpha particles.

Particulate Emissions Monitoring. Particulate emission monitoring consists of two steps: alpha screening of air-duct emission particulate sample filters and radiometric activity counting for TLLA and TLLB. Each filter is scanned for radioactivity using a portable alpha particle survey meter with an air proportional alpha detector before being removed from the holder and submitted for analysis. The second step is a TLLA and TLLB activity count. Alpha radiation is the principal type of radiation associated with radionuclide emissions at RFP. It can be measured by total alpha radiation detection. However, naturally occurring short-lived radionuclides, such as radon and thorium decay products, contribute to the total alpha activity. This contribution of decay products can be quantified by taking two counts of the air filter samples, one sample within 24 hours after collection to allow for the additional decay of this short-lived activity and another after 72 hours of decay. TLLA, which results primarily from plutonium, uranium, and americium, is estimated from the results of the two counts. This screening method provides a more sensitive analysis of radioactive duct emissions than SAAMs but requires a longer turnaround time for the laboratory data.

Specific Radioisotope Analyses. Laboratory analyses for specific radioisotopes in effluent air particulate samples is a complex process involving dissolution of the filters used to collect the particulates, separation of the constituents of interest, plating the constituents on a planchette, and counting the planchettes with sensitive detectors. Detailed quality assurance/quality control procedures, such as the use of laboratory control samples with radioactive tracers to quantify and assure proper chemical recovery of the radioisotopes of interest, are used to assure accuracy of the analyses. The advantage of the process is the low level of detection. The disadvantage is that four to six weeks elapse before results are available. Detection limits can be reduced by adding more time for the analyses (i.e., additional sensitivity can be achieved by increasing the counting time).

Gas Monitoring. Tritium is the only gaseous radioactive emission material routinely monitored at RFP. Tritium is monitored through liquid scintillation counting of discrete bubble impinger samples. Currently, scintillation counting persists as the most widely used industry technique for the analysis of tritium in water. However, improvements in the signal processing technology (both hardware and software) have improved the performance of modern scintillation spectrometers.

Nonradiological Emissions Monitoring. Beryllium emissions are sampled using the same methods and filters used for the radioisotope stack sampling previously described. The analytical method of analysis by Graphite Furnace Atomic Absorption of beryllium samples is considered the best available analysis technique. Additional metal emissions sampling could also use this sampling technique and appropriate methods. A more complete discussion of beryllium monitoring is included in Section 6.0.

Volatile Organic Compound Emissions. No VOC emissions are monitored by RFP. The changes in mission at RFP have led to a decrease in VOC use and VOC emissions from the plant. Online gas chromatograph monitoring instruments require high maintenance to achieve reliable monitoring goals. Summa™ canisters, Tenex tubes, and other monitoring equipment are also available. These VOC monitoring instruments are described in more detail in Section 6.0.

Radiological Ambient Monitoring. The RFP radioactive ambient monitoring program described in this section consists of two programs: the Radiological Ambient Air Monitoring Program (RAAMP) and the OU-specific monitoring program. Both air monitoring programs measure ambient plutonium, americium, and uranium particulate concentrations by collecting particulate samples using high-volume air samplers followed by radiological laboratory analysis. The RAAMP and OU-specific air monitoring methods are not real-time monitoring technologies because laboratory analysis is required. The current RAAMP and OU-specific monitoring programs are discussed more completely in Section 6.0.

Technologies involved in sample collection will be important in performing ambient air monitoring. For example, ultrahigh-volume air samplers are being developed. The advantage of ultrahigh-volume air samplers is that less time is required to collect a representative sample.

Nonradiological Ambient Monitoring. The RFP nonradiological ambient monitoring program currently consists of TSP monitors, PM-10 particulate monitors, and metals monitoring. Proposed actions described in this report include monitoring VOCs and additional metals.

TSP, PM-10 particulates, and beryllium are currently being monitored at four nonradiological particulate air sampling stations at RFP. Three of the samplers are maintained by CDH; the other station is maintained by EG&G. Nitrogen oxides are also monitored at one of the CDH air stations. A more complete discussion of nonradiological ambient monitoring instruments is provided in Section 6.0.

Ambient Volatile Organic Compounds. Currently, no VOC monitoring is performed in the Industrial Area other than worker protection during activities that could release VOCs. CDH's Air Quality Control Division does monitor for VOCs at three locations outside and along the RFP boundary, and two additional monitoring stations for VOCs are planned. Power access and land use permission are pending. CDH's air monitoring program uses Tenex tube air sampling instruments and EPA analysis Method TO-1 to monitor for VOCs.

Two laboratory-supported methods and one real-time method are commercially available for the detection of VOCs in air at environmental levels. The two laboratory-supported methods are Summa™ canisters and Tenex tubes. Portable gas chromatograph instrumentation is the real-time continuous monitoring method used for measuring VOCs. Assessment of portable gas chromatograph instruments revealed that they require high maintenance, are unreliable, and are not capable of laboratory detection levels. Collection of samples for laboratory analyses provides accurate measurement and is recommended where appropriate for specific D&D documentation.

Metals. Metals analysis may be performed on filters collected for particulate concentrations by high-volume and ultrahigh-volume air samplers. No real-time direct measurement monitoring instruments were identified for metal analysis in air at environmental levels.

Air Pollution Prevention and Fugitive Emissions Control - IAG Programs. The monitoring equipment used for the Air Pollution Prevention and Fugitive Emissions Control (Interagency Agreement Programs) is primarily related to occupational safety monitoring during short periods (less than 10 hours). The equipment is portable and provides direct and indirect real-time measurements of air quality. The instruments are designed to be used as close as possible to the work area (within approximately 5 to 10 meters).

The monitoring equipment recommended for use during the Air Pollution Prevention and Fugitive Emissions Control activities for air contaminant measurement include TSI piezobalance instruments, high-volume samplers, laser particle counters, Miniature Real-time Aerosol Monitor (MINIRAM), HNu trace gas analyzers, and Photovac Microtip handheld air monitors (DOE 1991). These technologies are designed to support occupational health and safety monitoring for worker protection. They are not appropriate for environmental monitoring and sampling. A more detailed discussion of the instruments and the procedures used for air pollution prevention and fugitive emissions control activities is provided in the *Plan for Prevention of Contaminant Dispersion* (DOE 1991).

9.2.1.2 Surface Water Technologies Assessment

The goal of the surface water monitoring technologies assessment was to identify technologies and monitoring instrumentation that could be used to monitor surface water quality during D&D activities. Applicability of monitoring and sampling equipment will be determined in part by the known or suspected COPCs related to a specific location or D&D activity.

Real-Time Telemetry Monitoring Systems. Radiotelemetry stations are currently used to collect real-time water quality parameters at 12 monitoring stations located within the RFP boundary; two stations are positioned within the Industrial Area. The existing telemetry monitoring stations, coupled with the establishment of additional telemetry monitoring stations, may provide data that could be used to determine baseline COPC concentrations. Additional telemetry monitoring systems will be located downstream of D&D activities or within related surface water drainage subbasins to establish baseline water quality before D&D activities begin.

In addition, surface water quality could be monitored during implementation of D&D operations to detect real-time changes in surface water quality. Real-time monitoring of surface water parameters and stream flow may allow for the most timely detection of abnormal surface water conditions and corrective measures response. The radiotelemetry monitoring stations are portable and solar-powered. Because the units are portable, they may allow monitoring units to be repositioned to new D&D locations when previous D&D activities have been completed. Siting of the units is limited only by the line of sight to the radio telemetry repeater tower.

Automated Surface Water Sampling. Thirteen stream gaging stations within the RFP buffer zone are equipped with automated sampling equipment (EG&G 1992). The existing automated surface water stations combined with additional automated surface water stations may provide a better understanding of baseline water quality conditions in D&D-specific locations or a drainage subbasin related to a specific D&D activity. Automated samplers can be programmed to collect samples during specific periods of potential releases to surface water such as implementation of D&D activities, snowmelt, and high storm-water events. Time-weighted composite samples can also be collected at automated surface water stations to establish baseline surface water quality conditions. Automated surface water stations can also be co-located with real-time radiotelemetry monitoring stations to increase sampling and instrument maintenance efficiency. Flow rates through flumes, weirs, and culverts can also be measured at automated surface water stations. The automated samplers can be easily disassembled and relocated to another D&D activity location; however, the flow structures are somewhat permanent. Monitoring stations are powered by a combination of battery packs, alternating current power lines, and solar panels. Surface water samples can be collected and analyzed by the laboratory for a variety of parameters including suspended sediment, total metals, total radionuclides, and organic constituents, depending on the specific COPCs.

Field Parameter Monitoring. Field parameter monitoring can be used to quickly investigate a possible upset condition and to identify locations where more detailed sampling and analysis are required. Parameters such as flow, pH, turbidity, and temperature, perhaps in combination with qualitative chemical analyses in the field, can provide a relatively quick assessment of basic water quality. Time elapsed is critical in defining response to a possible spill to surface waters.

9.2.2 Verification Monitoring Proposed Actions

As D&D activities are identified, consideration will be given to potential hazards, including COPCs that could be released and activities that could cause such releases. Verification monitoring will be designed to address specific activities, COPCs, and environmental media. Depending on the type of media monitored, verification monitoring may consist of both real-time water quality parameter monitoring and sample collection and laboratory analysis. Real-time devices will provide direct semiquantitative measurements of general chemical indicators; automatic samplers will collect samples for quantitative chemical analysis.

As discussed in previous sections, verification monitoring will be conducted to detect potential releases from D&D activities to environmental media. Because D&D institutes comprehensive engineering and pathway protection controls and the risk of undetected releases is low, the level of verification monitoring may vary, depending on the type of activity. Therefore, once D&D activities are identified, IM/IRA personnel will review the activity characterization information and communicate with D&D personnel to determine the level of verification monitoring necessary to assess pathway protection controls. If a D&D activity is confined to one room in a building and D&D controls will prevent releases to a particular pathway, it may not be necessary to monitor that pathway. Conversely, if the D&D activity entails significant building disturbance, verification monitoring systems may be required for all three environmental media. Verification monitoring programs will be implemented to collect a baseline data set as discussed in Section 9.4 and to monitor D&D activities as discussed in Section 9.5. Each verification monitoring system will be specific to a particular D&D activity and will be deactivated when the D&D activity is completed (with the exception of groundwater verification monitoring, which may continue for a specified time after activity completion). The verification monitoring systems are designed to be temporary and the components to be portable.

A detailed work package similar to those developed for transition activities will be prepared for D&D activities. COPCs will be screened for a particular D&D activity using the approach described in Section 9.3. Verification monitoring locations and specific details concerning instruments and sampling frequency will be included in the work package. Instruments currently in use as part of existing media monitoring programs at RFP will be used to the extent possible to limit expense and additional training. Monitoring methods used during OU RI and environmental investigations and preceding D&D activities, where appropriate, will also be incorporated into the proposed verification monitoring programs.

Air and surface water quality monitoring for indicator parameters, such as airborne particulates and general surface water and air quality parameters, were identified as the only indirect means for real-time monitoring of radiological air and surface water concentrations. Therefore, a priority of the assessment was placed on the use, applicability, and implementation of existing nonradiological instrumentation and monitoring systems currently supporting the RFP surface water and air monitoring programs.

The basic technologies in use are adequate for their intended purpose. Few available technologies would enhance the sensitivity or sample collection reliability of the current network; but, when appropriate, the technologies evaluated may be incorporated into the monitoring program as advances are made.

Prior to D&D and verification monitoring activities, the Ecology Division will work directly with the IM/IRA project manager and team to assess the following: (1) ecological impacts (aquatic and terrestrial) due to potential contaminant releases, (2) potential impacts from mitigative measures in sensitive areas, (3) siting of monitoring stations, and (4) information transfer of monitoring data.

9.3 BASIC METHODOLOGY FOR IDENTIFYING CONSTITUENTS OF POTENTIAL CONCERN

The COPCs that were considered in the evaluation of current environmental monitoring were identified in Appendices 3.1 and 3.2. For specific D&D activities, the list will be refined to include only those COPCs that may indicate a potential release from the area or building undergoing D&D. Figure 9-3 is a flow diagram that illustrates the process used to develop a COPC list for environmental monitoring conducted during specific D&D activities.

As indicated in the flow diagram, preliminary COPCs for monitoring during D&D activities will be identified using information from the following sources:

- documentation of known historical releases;

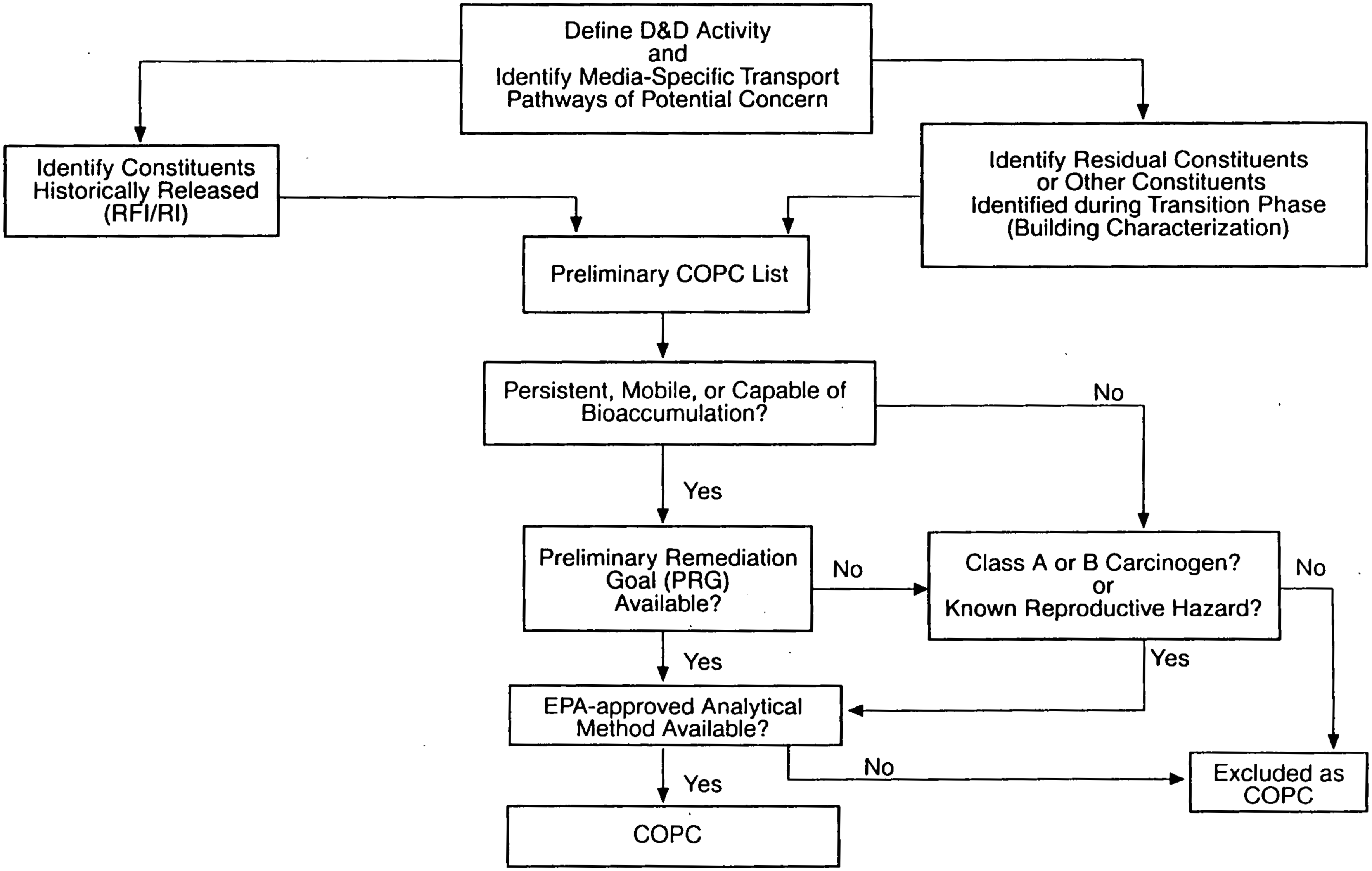
- releases from past management and handling of chemical product inventories and waste streams (identified from building characterization and assessments conducted under the Transition Phase.);

- data collected regarding possible residual constituents in building structures and equipment following the Transition Phase; and

- reports of spills of chemical product or waste streams from disposition during the Transition Phase. (Chemical products and hazardous wastes stored in buildings will be removed during the Transition Phase; therefore, spills from these materials will not be a factor during D&D.)

FIGURE 9-3
Industrial Area IM/IRA/DD
Chemicals of Potential Concern Selection Process
for D&D Verification Monitoring

FINAL



h:\wp\flat' ɔhics\fig-d&d (aldus) 8/14/94

9.3.1 Historical Releases

Historical releases in the affected area will be characterized through the ongoing RFI/RI activities that are being conducted in the Industrial Area. Much of this information is summarized in Appendix 3.3 (IHSS locations), Appendix 3.4 (PCB locations), and Appendix 3.5 (UBC locations). Locations of IHSSs, transformer sites, and UBCs are shown in Figure 3-2.

The RFP OU Managers will be contacted for further details regarding the IHSSs in the affected area and for a current list of constituents that have been identified from recent sampling. Any overlap between the D&D activities and the ongoing or planned RFI/RI activities will be identified. Overlap between D&D and RFI/RI activities (i.e., monitoring, groundwater sampling, surface water sampling, or decontamination) will be coordinated to minimize sampling or decontamination efforts and costs.

9.3.2 Removal of Bulk Chemicals and Waste Streams

Chemical products and waste stored in the affected area will be inventoried and removed during the Transition Phase. Chemical products that are stored in the building or the plant area will be identified using the latest version of EG&G's Chemical Tracking and Control System (CTCS) database. This database was described in Section 3.0 of this document. (See Appendices 3.6, 3.7, and 3.8 for an example of the types of COIs at each building.)

Hazardous wastes (stored in containers, tanks, and other units) and their storage areas will be identified during the facility or building characterization using EG&G's Water and Environmental System (WEMS) and Waste Stream Residue Identification and Characterization (WSRIC) databases described in Section 3.0 of this document. An example list of the RFP-permitted storage areas, based on data from the WEMS database for December 7, 1993 is presented in Appendix 3.7. This appendix should only be used as an example because the waste storage quantities and contents change frequently. WEMS also contains data regarding satellite accumulation and 90-day storage areas. The most up-to-date version of the WEMS database will be used to identify areas that may have been used to manage hazardous wastes.

Use of the CTCS, WEMs, and WSRIC databases will aid in locating waste streams and chemical inventories in the buildings of the affected area for proper disposition during transition. The disposition of the chemicals (i.e., inventory and consolidation of chemical storage in one building or reuse of chemicals at another building) will be conducted under the Transition Phase before D&D begins. The transition plan will detail how the chemicals will be packed and transported to their destination and must comply with applicable regulations for materials handling, transportation, and labeling and container requirements. Because these activities will be handled under the RFP Transition Phase and are not considered D&D activities, they are not discussed further in this document.

Knowledge of constituents identified and removed during Stage II of transition is important for D&D activity planning. Although chemical products and waste streams will be removed from the affected area, constituents may have been released in accidental spills during past management of chemicals and waste streams. Residual constituents may remain in building structures and building equipment after the Transition Phase. Constituents released from spills of chemical product during transition will be handled under the emergency response plans for the building transition. However, spills that resulted from past storage and management of hazardous wastes may be identified during the Transition Phase (e.g., through implementation of a RCRA Closure Plan and, if applicable, subsequent RCRA Corrective Actions). This information will be summarized in the building characterization and assessment reports that will be prepared in the Transition Phase. Because these constituents may still exist during D&D, they will be incorporated into the preliminary COPC selection process and considered for environmental monitoring of D&D activities.

9.3.3 Refining the Constituents of Potential Concern List

It will not be necessary to monitor for the entire list of preliminary COPCs during D&D activities. Depending on the area or building undergoing D&D, the complete list of COPCs may be unnecessarily lengthy. In such instances, screening methods may be applied to identify a subset of target COPCs for the particular D&D activity. The goal of this screening approach is to identify COPCs that require verification monitoring.

Figure 9-3 illustrates the screening process designed to reduce the preliminary COPC list. It is anticipated that the screening process will result in a concise COPC list specific to the area or building undergoing D&D. The screening approach focuses on constituents that have been previously identified in the area or building. These "preliminary" COPCs can be identified from completed investigation reports or Building Characterization and Assessment reports if they are available for review.

As shown in Figure 9-3, the constituents identified as preliminary COPCs are first evaluated for fate and transport characteristics such as the persistence, mobility, and potential for bioaccumulation. Those constituents that are highly persistent or highly mobile can serve as indicators of a chemical release. It is anticipated that these constituents are the most likely chemicals to be detected by the monitoring programs if a release occurs. Specific numerical criteria can be used to evaluate chemical fate and transport mechanisms. Physico-chemical parameters that describe persistence and mobility include environmental half-life, water solubility, the log octanol/water partition coefficient (log K_{ow}), and the equilibrium constant (K_{oc}). Chemical mobility is generally proportional to water solubility and inversely proportional to K_{ow} and K_{oc}. Based on Draft EPA Region 8 guidance, chemicals with log K_{ow} less than 2.7 and K_{oc} less than 50 are considered to be highly mobile, while chemicals with log K_{ow} greater than 3 and K_{oc} greater than 500 generally have low mobility potential (EPA 1994).

Persistence is measured by the number of days required to reduce a chemical's concentration by one-half through biotic and abiotic degradation processes. Chemicals with half-lives in water of more than 90 days are considered highly persistent, whereas those with half-lives less than 30 days are not considered persistent in water (EPA 1994). Generally, chemicals with log K_{ow} greater than 3 begin to have a high bioaccumulation potential.

The next phase of COPC screening involves a qualitative toxicity screening step. The availability of chemical-specific preliminary remediation goals (PRGs), currently under development for the Rocky Flats Plant, will be assessed in addition to chemical carcinogenicity and evidence of reproductive hazard. Chemicals that are not persistent, mobile, or capable of bioaccumulation and are not Class A or B carcinogens (based on EPA's weight of evidence classification system for carcinogenicity) or a known reproductive hazard will be eliminated as COPCs. Furthermore, if a chemical is persistent, mobile, or capable of bioaccumulation but does not have a PRG and is not a Class A or B carcinogen or reproductive hazard, it will be excluded as a COPC. Those chemicals that meet the fate and transport criteria as well as the toxicity screen will remain as COPCs, and enter the final screening step.

The last step of the COPC screening addresses the availability of EPA-approved analytical methods for analyses conducted under the environmental monitoring program. If an EPA-approved method is not readily available, the chemical is excluded as a COPC. Those with appropriate EPA methods will remain as COPCs.

9.3.4 Baseline Data Collection

Data collected from current RFP monitoring networks will be used when compiling baseline data. However, additional monitoring recommended in the media-specific sections of this IM/IRA/DD will be required, in some cases, to collect baseline data for the constituents on the COPC list that are not monitored by the current network. Monitoring is required before start of the D&D activity. Baseline data are essential to establishing action levels for the verification monitoring. The media-specific sections describe the proposed actions.

9.3.5 Media and Pathway Identification

The media that could potentially be impacted by D&D activities are air, surface water, soil, and groundwater. Section 10.0 contains a description of the general conceptual site model for D&D activities.

9.3.6 Verification Monitoring

Verification monitoring may consist of real-time measurements, when possible, of general chemical categories and laboratory analysis of grab or composite samples for specific constituents. The verification monitoring program will be designed to target COPCs identified for specific activities. Real-time monitoring has significant detection limitations compared to laboratory analyses, but circumstances do exist where real-time monitoring could be used to detect acute releases.

Long-term fluctuations in many concentrations of COPCs will be measured using existing components of groundwater, surface water, air effluent, and ambient air sampling programs. These results may be used to (1) supplement/verify D&D activity monitoring, (2) identify additional data needs for monitoring and engineering controls, and (3) identify releases that require a response action. Proposed actions for the verification monitoring program were presented in Sections 4.0, 5.0, 6.0, and 7.0. When these proposed actions are implemented, acute and chronic duration releases may be detected before they leave the Industrial Area based on the baseline data set that will be available for comparison.

9.4 BASELINE METHODOLOGY

As discussed in previous sections, historical data will be compiled or new data may be collected from verification monitoring locations to compile a baseline data set. Baseline data sets will be prepared for media that could be affected by the D&D activity, as described in Sections 4.0, 5.0, and 6.0. These previous sections identify the types of monitoring points that will require a baseline data set. Baseline conditions will be established for COPCs associated with the D&D activity, building, subbasin, monitoring well, or other component, as necessary, and as described in Section 3.0.

Baseline Data Set. A statistically-based control chart method has been selected to identify warning limits during verification monitoring. The development of baseline for a control chart requires, according to available literature, a minimum set of data points to establish a statistical mean. "Baseline" will be the statistical mean of the data set. Data points are plotted with the sample or parameter value on the ordinate and the time of sampling on the abscissa. If historical data are available, a baseline data set will consist of a minimum of 12 samples. If a new sample location must be installed for verification monitoring or historical information is not available, the maximum number of samples available before the D&D activity begins will constitute the baseline data set. Historical data will be used, if they are representative and free of statistical bias. If additional data become available, baseline can be recalculated. If changes occur to what is assumed to be a stable mean, then a trend will be evaluated.

Distribution. Initially, the data will be assumed to be normally distributed. As additional data become available, the distribution of COPC concentrations at a monitoring location will be evaluated to verify the assumption of normal distribution. If the COPC concentrations are not normally distributed, the data will be tested to determine the distribution type. The appropriate statistical formulas will be used to calculate the warning limits and control limits for the appropriate distribution, e.g., log normal, gamma.

Warning and Control Limits. Once the data are plotted and the distribution type has been identified, the warning limits and control limits will be calculated. If the distribution is normal, the upper warning limits will be calculated using the mean plus two times the standard deviation, and the upper control limits will be calculated using the mean plus three times the standard deviation, with the exception of pH. To develop both upper and lower limits, warning limits for pH will be calculated using the mean plus or minus two times the standard deviation; control limits will be calculated using the mean plus or minus three times the standard deviation. If the data distribution is normal, about 95 percent of the COPC concentrations should fall within two standard deviations of the mean, and more than 99 percent within three standard deviations of the mean.

Warning and control limits will be calculated for each COPC at specific monitoring locations. These limits will provide the basis of comparison for the verification monitoring results. As verification monitoring results become available, each data set will be compared to the statistically-based limits. If COPC concentrations are above warning limits, the data will be compared to control limits and evaluated to assess potential D&D release, as described in Section 9.5. Real-time monitoring of pH in surface water will be based on the upper and lower warning limits.

Warning limits based on a limited number of data points (baseline population) will present a higher risk of false-positive or false-negative detections. The more data points that are acquired during the establishment of the baseline data set, the better the ambient conditions are characterized. Comparison of analytical data to the warning limits is critical. The comparison must be evaluated based on the number of data points used to establish the population.

Nondetect Concentrations. The control chart method of calculating warning and control limits is appropriate when COPCs have been detected and concentrations are known. If COPCs are below detection limits, an arbitrary factor of the detection limit may be used to establish concentrations for the control chart. Depending on the results of the baseline data set and the toxicity of specific COPCs, any detection of a particular COPC may constitute a warning limit. The most appropriate method of evaluating nondetections will be selected when the baseline data set is compiled for a specific area.

9.5 PREPROGRAMMED RESPONSE

The objective of the verification monitoring program is to detect potential releases from D&D activities to groundwater, surface water, and air pathways. In Sections 4.0, 5.0, 6.0, and 11.0, the additional data needs, proposed actions, and subtasks to support implementation of the verification monitoring program have been identified and presented. The objective of this section is to present the preprogrammed responses that will be initiated after D&D activities begin. The preprogrammed responses are based on the proposed actions for each medium. The responses are also based on the administrative links described in Section 9.1.8. The preprogrammed responses assume all D&D and verification monitoring pathway protection mechanisms are in place. The following subsections describe the preprogrammed responses for the groundwater, surface water, and air verification monitoring programs.

9.5.1 Groundwater Preprogrammed Response

The groundwater preprogrammed response is based on the following: (1) verification monitoring will consist of the existing quarterly groundwater monitoring program for selected monitoring wells, and (2) because groundwater moves relatively slowly, there is no emergency response component in the groundwater verification monitoring. The preprogrammed response for groundwater is shown in Figure 9-4.

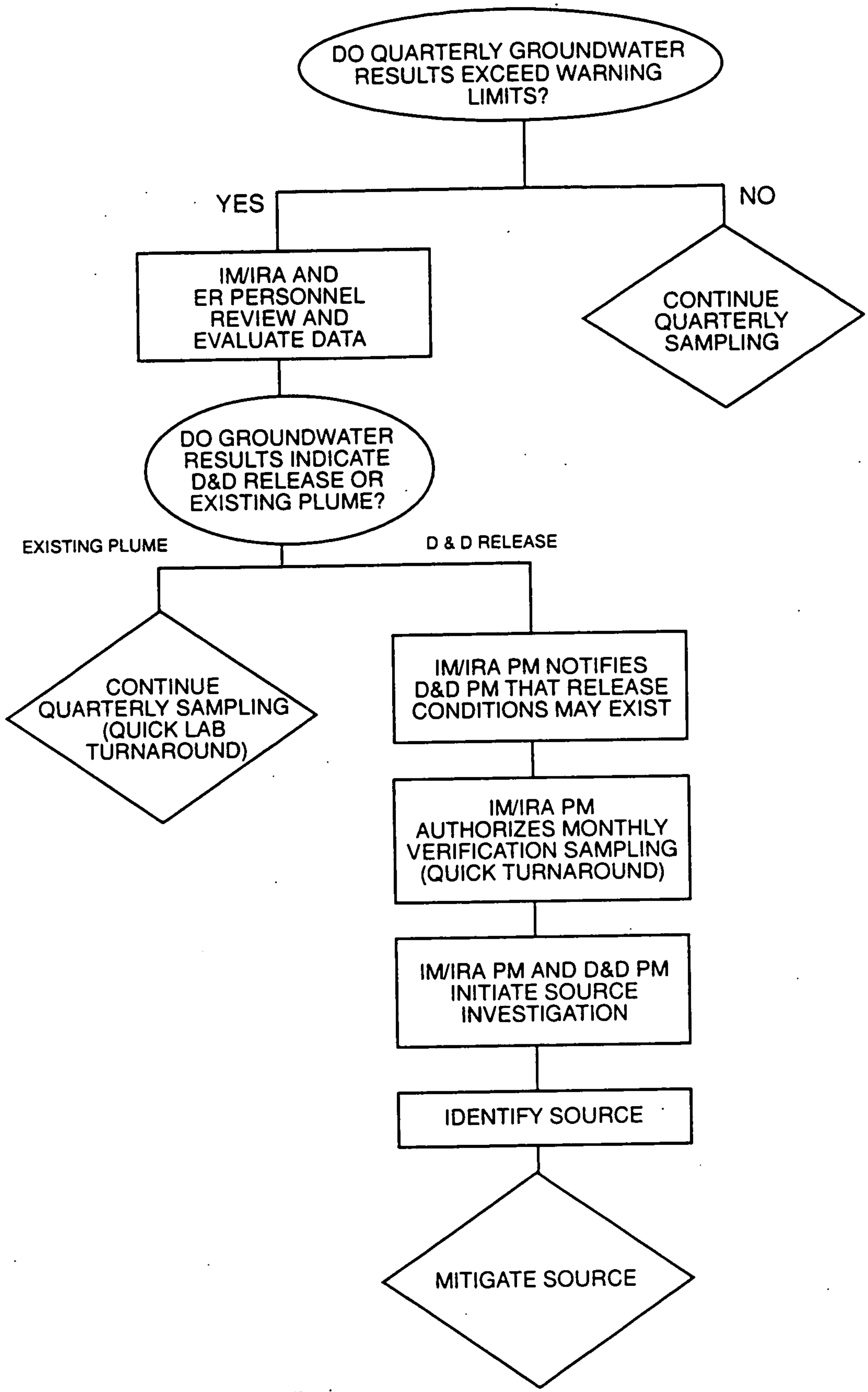
As discussed in Section 4.0, a set of monitoring wells in the Industrial Area will be identified that are upgradient and downgradient of D&D sites. New monitoring wells will be installed as proposed in Section 4.0 and as data needs are identified throughout the D&D activities. The new monitoring wells will be incorporated into the existing quarterly groundwater monitoring program. Baseline data will be compiled using either historical data from previously installed wells or, if the well is new, through sample collection before the D&D activity begins. Warning and control limits will be established using the methodology presented in Section 9.4.

Well points will also be installed close to each D&D site. The number and locations of well points will be adequate to provide a reasonable line of detection of groundwater quality changes, will fill gaps in coverage by existing and new monitoring wells, and will be biased toward locations on the downgradient side of the D&D site. The well points will also help determine local variations in groundwater elevations and flow rates. Quarterly sampling for an appropriate set of COPCs or indicator chemicals will be conducted at each well point to establish baseline conditions.

During D&D, quarterly groundwater results for the designated set of wells and well points will be extracted from the RFEDS database. The results will be compared to statistical warning limits. To expedite the comparison of results to warning limits, data that have not been validated will be used in the comparison. The comparison of quar-

FINAL

FIGURE 9-4
INDUSTRIAL AREA IM/IRA/DD
PREPROGRAMMED RESPONSE
GROUNDWATER VERIFICATION MONITORING



h:\wp\flats\graphics\fig-gw (aldus) 6/22/94 terly groundwater results to warning limits will continue throughout the D&D activity and, after the D&D activity, for a specified period of time determined based on the type of activity.

If groundwater results from the monitoring wells and well points identified for verification monitoring indicate that levels of COPCs are above warning limits, the upgradient and downgradient COPC concentrations will be evaluated to assess whether elevated levels are associated with existing plume movement through the area or if there is a potential release from D&D activities. If the evaluation of the data indicates that elevated results are indicative of an existing contaminant plume passing through the D&D site, the quarterly groundwater results will continue to be reviewed to assess plume movement and potential releases from D&D activities. Depending on the results of the existing plume/D&D release assessment, quarterly samples from specific monitoring wells or well points near the D&D site will be requested for a quick laboratory turnaround to accelerate the review of data.

If routine evaluation of quarterly groundwater results indicates concentrations of COPCs above warning limits and it is determined that the elevated levels are not associated with existing plume movement, notification will be provided to appropriate personnel that potential release conditions may exist. Monthly groundwater sampling will be authorized for quick laboratory turnaround for the monitoring wells at the specific D&D site. Monthly sampling results will continue to be evaluated closely for evidence of potential release from D&D activities.

The IM/IRA project manager and D&D project manager, based on the communication links described in Section 9.1.8, will initiate a source investigation at and surrounding the D&D site. The project managers and designated key personnel will conduct a review of ongoing activities, including a site walk and personnel interviews. Ongoing D&D operations will be evaluated to determine if any activity has the potential to release contaminants into groundwater either directly or indirectly. The D&D results from the occupational health and safety monitoring network will be reviewed to determine any correlations between elevated groundwater results and D&D results. Ongoing groundwater modeling programs will be reviewed and the upgradient and downgradient conditions will be thoroughly assessed. Warning limits will be re-evaluated, if necessary, to assess the relevance of the statistically based concentrations. If a source is identified, appropriate mitigation efforts will be instituted. If a potential release associated with D&D activities is detected after the activity has been completed, appropriate measures will be instituted to mitigate the release.

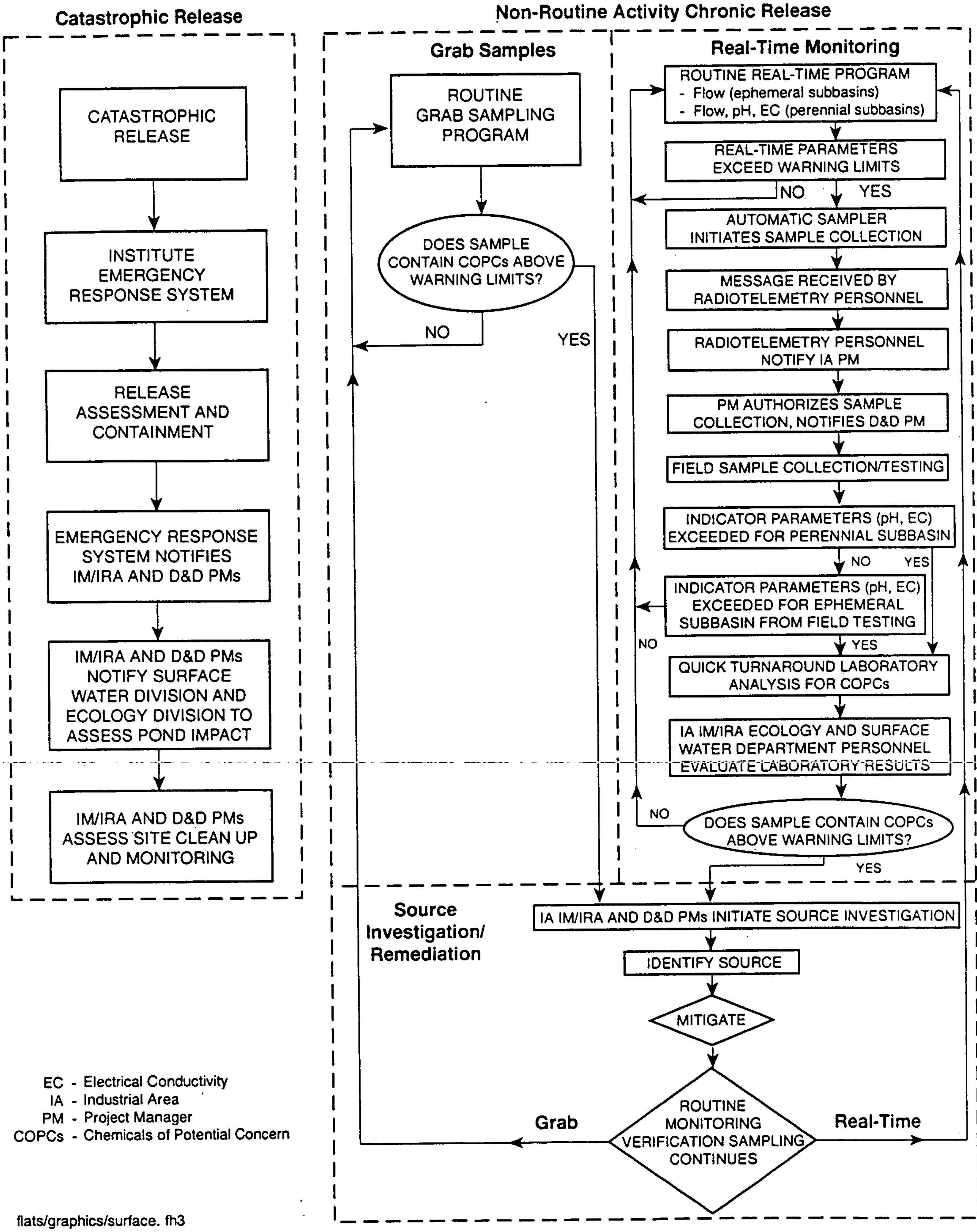
9.5.2 Surface Water Preprogrammed Response

As discussed in Section 5.0, the surface water verification monitoring program consists of two types of monitoring: routine grab samples and real-time monitoring. The preprogrammed response for surface water is shown in Figure 9-5. This logic diagram also presents a third scenario that comprises the emergency response component of the verification monitoring program. Because the objective of the surface water verification monitoring program is to detect potential releases from D&D activities, the proposed actions are designed to detect subtle changes in existing conditions. A catastrophic release caused by failure of engineering pathway protection controls, such as a tank or berm rupture, is not addressed by the proposed surface water verification monitoring program. Existing emergency response procedures at RFP are designed to address such catastrophic releases. Emergency response procedures are summarized in Section 9.6.

If a catastrophic event occurs, the Industrial Area and Pond IM/IRA managers will be notified.

During a D&D activity, real-time monitoring equipment will be used to monitor water quality and stream flow indicators in the specified subbasin drainage(s). For perennial

FIGURE 9-5
INDUSTRIAL AREA IM/IRA/DD PREPROGRAMMED RESPONSE SURFACE WATER VERIFICATION MONITORING



flats/graphics/surface. fh3

flow conditions (continuous flow), water quality probes and flow measuring equipment will be integrated into the existing radiotelemetry computer system. For ephemeral or episodic flow conditions, only stream flow measurements will be connected to the existing radiotelemetry computer system.

For perennial stream conditions, if pH, electrical conductivity, or stream flow are outside preestablished warning limits, a message will be sent to the radiotelemetry computer system indicating that the real-time monitoring parameters are outside warning limits and that the automatic sampler has collected a sample for laboratory analysis. This preprogrammed response will also be used for ephemeral flow conditions based on real-time monitoring of flow. In this case, an automatic sample will be collected based on the presence of water flow without a precipitation event or if stream flow has exceeded a predetermined flow rate or stage.

To ensure acknowledgement, the radiotelemetry computer message cannot be deleted until appropriate acknowledgement is provided by the operator. Radiotelemetry personnel will contact the Industrial Area IM/IRA project manager when a computer message is received. The Industrial Area IM/IRA project manager will authorize sample pickup, field testing, expedited laboratory analysis, and data reporting. At this time, the IM/IRA project manager will notify the D&D project manager, and the Surface Water and Ecology Divisions. Laboratory sample results will be compared with warning limits for specific COPCs. For ephemeral stream subbasin locations, field testing for pH and electrical conductivity will be performed. If the results from these field tests are above predetermined warning limits, laboratory analysis for COPCs will be performed. Figure 9-5 is a flow chart that details the preprogrammed response actions for a catastrophic release (acute) and a chronic nonroutine activity release.

If COPCs are above warning limits, then the Industrial Area IM/IRA and the D&D project managers will initiate a source investigation to determine if the D&D activity is causing a potential release. The Surface Water and Ecology Divisions will be notified of existing conditions. The source investigation will include a review of D&D activities, including a site walk and personnel interviews. Ongoing D&D operations will be evaluated to determine if any activity has the potential to release contaminants into surface water either directly or indirectly. The D&D results from the occupational health and safety monitoring network will be reviewed to determine any correlations between elevated surface water results and D&D results. If necessary, sampling will be initiated upstream of the subbasin exit and downstream of the D&D activity to evaluate other potential sources. The terminal pond mostly likely affected by a potential release may also be sampled, and the NPDES sample results and results from other monitoring programs will be reviewed.

Because real-time water quality parameters may not be sufficient to routinely detect certain COPCs, occasional grab samples will be collected and analyzed for specific COPCs, if subbasin flow is available. The sample results will be compared with warning limits. If COPCs are detected above warning limits, then a source investigation will be conducted, as described in the previous paragraph. Routine grab sample collection and analysis will continue throughout the D&D activities to confirm real-time monitoring and support source investigations. As discussed in Section 5.7.2, attempts to collect grab samples will be made at least two times during shorter D&D activities (two months or less in duration) and monthly during longer D&D activities. However, the actual frequency of sampling will depend on the timing of the D&D activity and the occurrence of flow within the subbasin.

Communication is a critical aspect of the preprogrammed response system. The IM/IRA project manager will communicate and distribute monitoring data and reports to all affected departments at RFP. The Surface Water and Ecology Divisions will be informed about releases to assess any effects to the pond system and the aquatic and terrestrial ecology in the Industrial Area.

9.5.3 Air Preprogrammed Response

As discussed in Section 6.0, there is a comprehensive air monitoring program in place at RFP. The air verification monitoring program will consist of the existing Industrial Area fenceline air sampler locations and Summa™ canisters co-located with four existing samplers. A SAAM alarm causes certain preprogrammed procedures to be initiated at RFP. These procedures are presented in standard operation procedure ROI-5.07 (EG&G 1993a). SAAM response procedures will be instituted during D&D activities, with no exceptions.

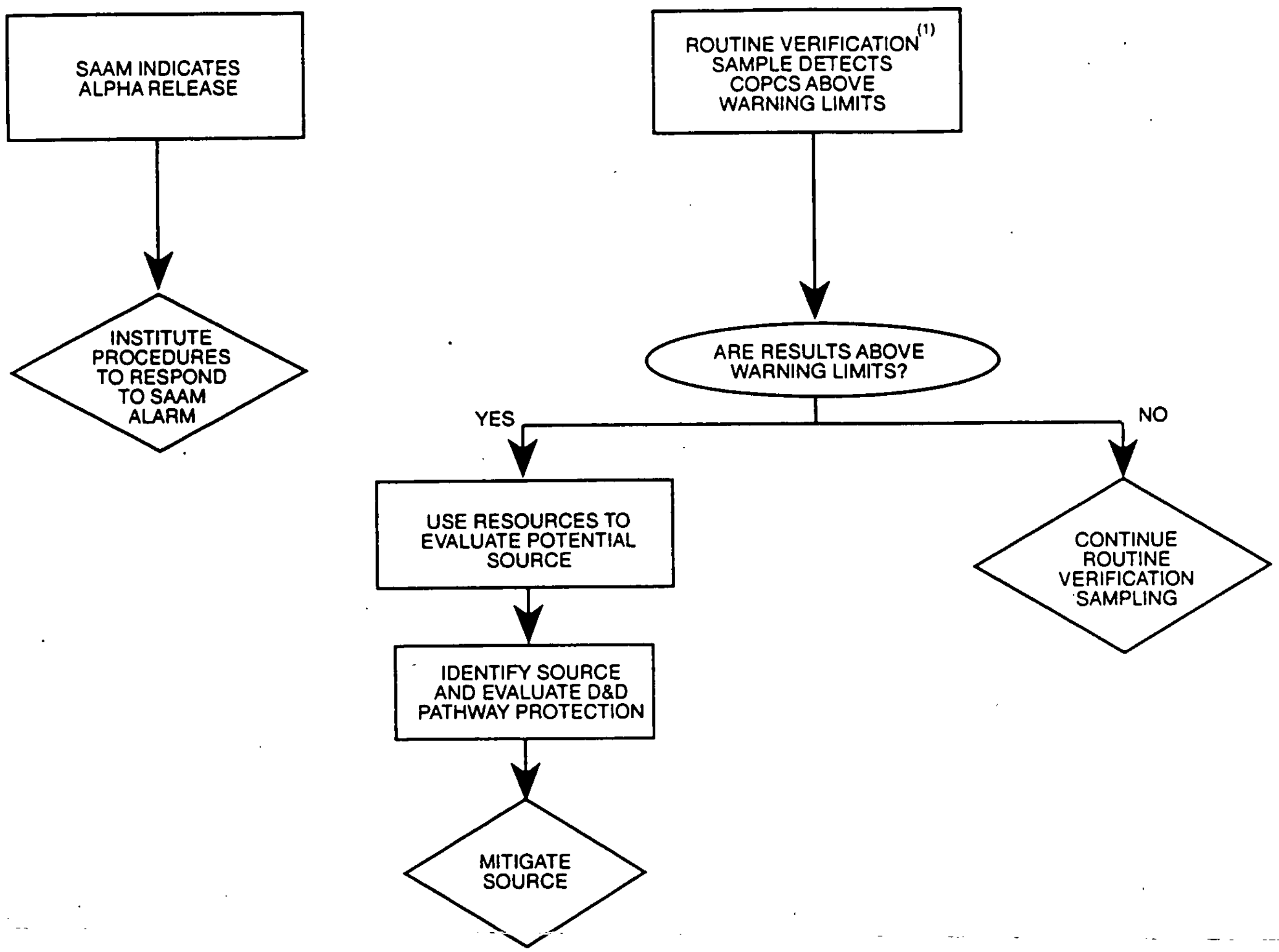
Routine air verification monitoring consists of periodically analyzing the samples from Industrial Area fence line air monitors for radiological and metals COPCs, and from the four Summa™ canisters, for volatile organic COPCs. The monitoring proposed actions are described in Section 6.0. IM/IRA and air program personnel will extract nonvalidated verification monitoring data from the RFEDS database as they become available and compare the results with warning limits. As shown in Figure 9-6, if air monitoring results for specific COPCs are above warning limits, the IM/IRA and D&D project managers will initiate a source investigation. The source investigation will consist of using available resources to evaluate potential sources of contaminants to air. Possible resources may include camera systems and computer models that incorporate real-time meteorological data. The source investigation will consist of a review of D&D activities, including a site walk and personnel interviews. If a source is identified, mitigation procedures will be initiated.

9.5.4 Pathway Protection

It is important to note that facility characterization, hazard assessment, and removal of nonfixed contamination and excess chemicals from the buildings during transition will

FINAL

FIGURE 9-6
INDUSTRIAL AREA IM/IRA/DD
PREPROGRAMMED RESPONSE
AIR VERIFICATION MONITORING



(1) Routine verification samples consist of samples that are collected from exisiting monitoring stations and analyzed for activity - specific COPCs and Summa ™ canisters.

h:\wp\flats\graphics\fig-air3 (aldus) 7/17/94 reduce the potential for release during D&D. Information from facility characterization will be used when developing work packages for D&D activities. Work packages will be reviewed by personnel from the RFP Environmental Protection Management group. Identification of potential sources, pathways, and pathway protection requirements will be included in each activity work package. Methods of protecting pathways may be a physical engineering control, a set of procedures that prevents release, or a combination of physical and procedural controls.

The media of concern are air, surface water, and groundwater. Pathways to surface water and groundwater include foundation drains, sumps, sewer lines, other piping including process lines, cracks in foundations and walls, and releases outside buildings during cleaning or chemical handling activities. Potential pathways to the air and surface water include stacks or vents, releases from contaminated equipment during removal from fixed locations, suspension of contaminated soils, and release of fugitive dust.

The primary method for preventing releases through the pathways described in the previous paragraph involves early pathway identification and elimination of the pathway. Possible examples of pathway elimination include the following engineering controls: (1) seal off all unnecessary pipes, and process and sewer lines; (2) ensure maintenance of ventilation system; (3) decontaminate equipment, tanks, and materials within buildings before removal; (4) control soil and dust suspension; (5) stop activity when weather conditions reach a predetermined threshold level; and (6) cover soil, drains, vaults, ditches, etc., with impermeable and bermed control structures.

A specific pathway protection method could involve extending foundation drains with piping to a selected treatment or collection system. This method would ensure that groundwater and surface water would be protected if D&D activities release contaminants to the foundation drains. Spraying the interior and exterior of buildings and surrounding soils with water during demolition, construction, or other heavy activity is an example of a control measure for fugitive dust and soil suspension. Another example would be berming to prevent inflow of storm water into an area undergoing D&D and to collect water that has become contaminated when used for dust suppression. All pathway protection methods will be evaluated and selected by D&D personnel when a D&D activity is scheduled. Each D&D activity will be assessed for pathway protection individually.

During source investigations conducted when a potential release is detected to environmental media of concern, an evaluation will be made to determine if pathway protection mechanisms are intact and adequate. D&D personnel will be instrumental in pathway protection evaluation and mitigating potential releases. As described in Section 9.1.8, the IM/IRA and D&D project managers will maintain frequent communication throughout the D&D activity and concurrent verification monitoring program.

Source Investigations. As presented in the preprogrammed response sections for surface water and air, there are provisions for instituting emergency response procedures. If emergency response procedures are initiated, the responding team can authorize activity shutdown. The preprogrammed responses described in the previous subsections are not intended to replace any part of an emergency response procedure. The objective of the verification monitoring program is to detect less obvious, noncatastrophic releases that may not result from a pathway protection failure.

For this reason, source investigations initiated as a result of the verification monitoring program will not require the immediate shutdown of a D&D activity. It is crucial to the investigation of subtle changes in environmental media quality that discrete activities continue, allowing the source investigation team to observe tasks directly.

9.6 RESPONSE PLANNING

As previously described in Section 9.5, the preprogrammed responses for the verification monitoring system will have an emergency response component. Existing RFP emergency response plans and methodologies provide this link to the comprehensive existing systems for responding to certain types of potential releases during D&D. The *RFP Transition Plan* (DOE 1992) describes an emergency response approach that is based on the existing RFP emergency program elements and designed for transition. The D&D emergency response link was developed using the *Rocky Flats Plant Site-wide Environmental Compliance Program Management Plan* (EG&G 1993b) and *Rocky Flats Plant Emergency Plan* (EPLAN) (EG&G 1993c). These plans are described in the following paragraphs.

The *Rocky Flats Plant Site-wide Environmental Compliance Program Management Plan* (EG&G 1993b) documents a formalized program to address statutes related to environmental protection, waste management, and environmental restoration. Section 9.0 of the Environmental Compliance plan identifies DOE orders and federal and state environmental laws and regulations that address environmental occurrence notification and reporting requirements and the existing programs at RFP that have been established to meet the requirements.

The RFP EPLAN establishes the planning, preparedness, and response concepts for emergencies at the plant. The goals of the EPLAN are to protect the health and safety of onsite personnel and the public, limit damage to facilities and equipment, minimize impact to onsite operations and security, and limit adverse impacts on the environment (EG&G 1993c). A summary of the contents of pertinent EPLAN sections follows:

- Section 4.0 provides the definitions of emergency event classes and emergency action levels used at RFP.

- Section 6.0 describes the hazards assessment process used as the basis for emergency planning and the consequence assessment process for obtaining and coordinating initial and continuing emergency information and situation-dependent field data.

- Section 7.0 outlines protective actions based on protective action guides and emergency response planning guidelines, defines the RFP emergency planning zone, and describes requirements for personnel accountability, communications, termination of an emergency, and shutdown of operations.

Additionally, procedures for emergency notifications are set forth in the *RFP Policy Manual* (EG&G 1993d) and *Planning and Preparedness for Operational Emergencies* (EG&G 1993e), both of which are frequently updated.

According to the EPLAN, when an event or condition is discovered, initial response follows these standard procedures:

- The employee discovering the event reports the condition to a supervisor, building management (Operations/Shift/ Building/Facility Manager), or shift superintendent, or calls RFP extension 2911. (Note that discovery of an event or condition could originate with an alarm indicating an out-of-normal condition. Such alarms often are tied to various emergency response systems.)

- Building management categorizes the occurrence, notifies the shift superintendent (all occurrences), implements the Building Emergency Plan and Implementing Procedure, as appropriate, and directs initial preliminary assessments for building occupants. (A shift superintendent is always on duty.)

- Based on the severity of the event, and building management's recommendation on the categorization or emergency classification, the shift superintendent reviews known information in accordance with 1-38300-ADM-16.02, Occurrence Categorization, and 1-15200-EPIP-04.01, Emergency Classification. The RFP Response Flow Chart provides the process for categorizing, classifying, and responding to occurrences and emergencies (EG&G 1993f).

DOE-RFO, Rocky Flats management, and subcontractor employees are required to report occurrences as defined in DOE Order 5000.3B, Occurrence Reporting and Processing of Operations Information. A leaflet titled "Employee and Subcontractor Occurrence Reporting Notification Process" was prepared by Facility Operations Management (Environmental Restoration). The leaflet defines an environmental occurrence, an event, and a condition, and includes emergency telephone numbers and a checklist of important information to notice during an emergency. The system includes the following activities related to occurrences: identification, categorization, notification, critique/fact-finding, root-cause analysis, corrective actions, reporting, and lessons learned.

To support immediate response, RFP maintains 24-hour emergency response capabilities by ensuring that a shift superintendent, fire department personnel, emergency medical technicians, an ambulance service, and area safety, security, operations, and maintenance personnel are available at the facility. Additional subject matter experts are on call to provide support in a variety of areas. Environmental, medical, safety, industrial hygiene, security, regulatory, and facility experts are included in this cadre.

It is anticipated that failure of D&D engineering controls resulting in a significant acute release of material to the environment will trigger the emergency response system. Examples of such failures include a berm or tank rupture or release of significant quantities of radiological material. The preprogrammed responses discussed in Section 9.5 do not require an emergency response action because data evaluation is required to determine if there has been a potential release. The objective of the D&D verification monitoring is to evaluate and detect releases that are not of a catastrophic or occupational safety and health nature.

9.7 REFERENCES

EG&G Rocky Flats, Inc. 1993a. *Draft Rocky Flats Plant Radionuclide Air Effluent Emissions Monitoring Program Plan.* RCN-040-93

EG&G Rocky Flats, Inc. 1993b (July 30). *Rocky Flats Plant Site-wide Environmental Compliance Program Management Plan.*

EG&G Rocky Flats, Inc. 1993c (June 30). *Rocky Flats Plant Emergency Plan.* 1-64000-EP-01.00.

EG&G Rocky Flats, Inc. 1993d. *Rocky Flats Plant Policy Manual.*

EG&G Rocky Flats, Inc. 1993e. *Planning and Preparedness for Operational Emergencies.*

EG&G Rocky Flats, Inc. 1993f (December 2). Mark Burmeister, EG&G OU1 Treatment Facility. Telephone conversation with T.C. Wait of Jacobs Engineering Group Inc. about Building 881 foundation drains.

EG&G Rocky Flats, Inc. 1992. *Evaluation of the Rocky Flats Surface-Water and Sediment Monitoring Programs.*

U.S. Department of Energy. 1994 (January 14). *Office of Environmental Restoration (EM-40) Decontamination and Decommissioning Guidance Document.* Draft 3.

U.S. Department of Energy. 1992 (July). *Rocky Flats Transition Plan, Report to Congress.*

U.S. Department of Energy. 1991 (November). *Plan for Prevention of Contaminant Dispersion*. Final. Rocky Flats Plant. Golden, Colorado.

U.S. Department of Energy. 1988 (September 26). DOE Order 5820.2A. *Radioactive Waste Management*. Chapter V - Decommissioning of Radioactivity Contaminated Facilities.

U.S. Environmental Protection Agency. 1994 (January). *Evaluating and Identifying Contaminants of Concern for Human Health*. Draft. Region 8.

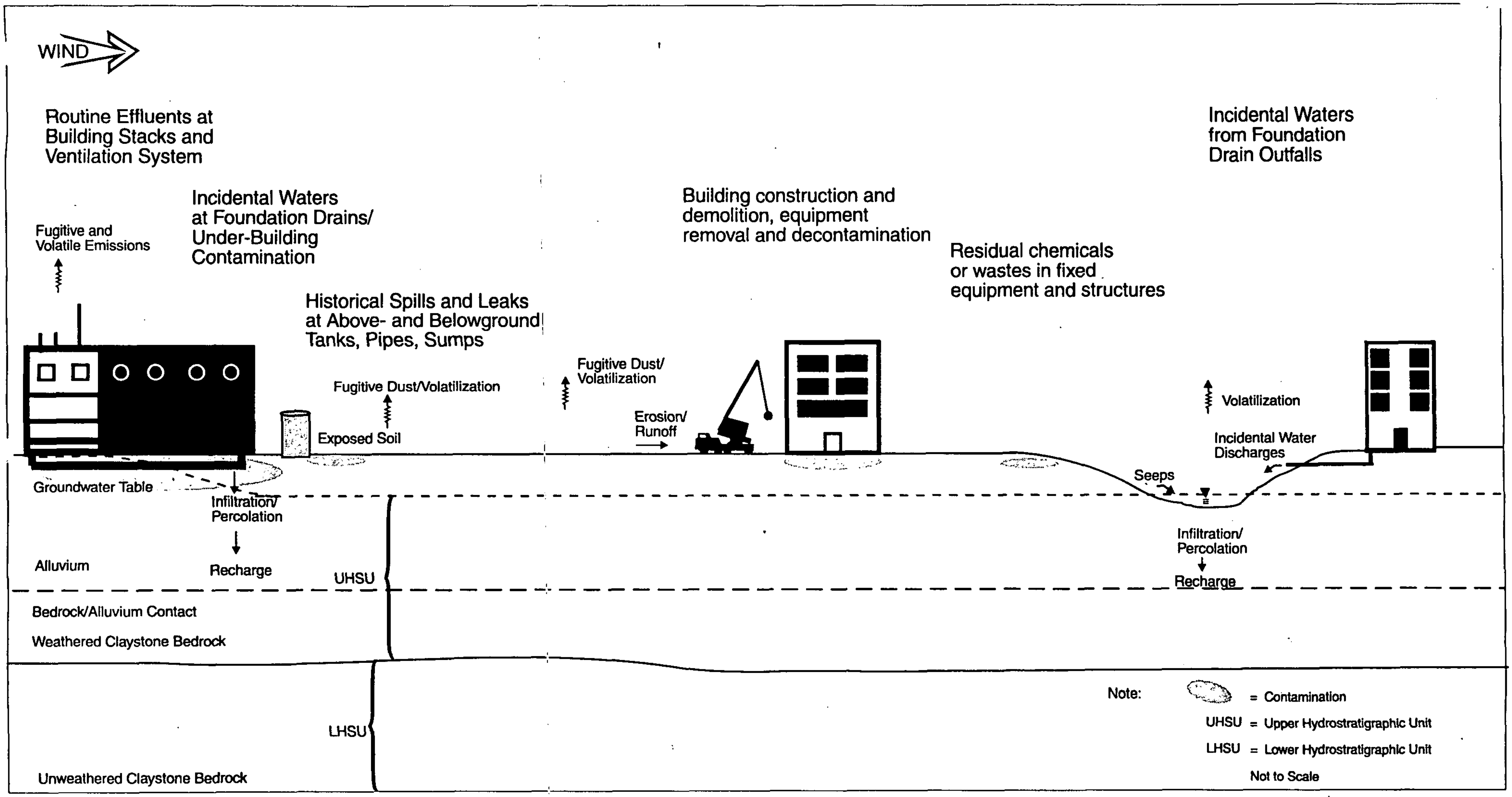


FIGURE 10-2
Industrial Area IM/IRA/DD
Future Conceptual Site Model

WP\FLATS\IM-IRA\FIG10-2.CDR

from contaminated soils and surface waters; (3) fugitive dust emissions from contaminated surface soils; (4) erosion, runoff, and overland flow of contaminated surface waters or soils; (5) infiltration and percolation through soil; (6) discharge and overflow from building foundation and footing drains; and (7) effluent emissions from ventilation systems. Additional primary release mechanisms specific to D&D include (1) volatilization from residual constituents in equipment, tanks, and piping; (2) fugitive dust emissions from equipment and ventilation system removal, and building demolition; (3) releases to incidental waters from building and equipment decontamination; (4) contaminant release to building floor, foundation, or footing drains from decontamination water; (5) volatile and fugitive emissions from under-building soil excavation; and (6) runoff or overland flow from excavation of UBC areas.

10.2.2 Primary Transport Media

Primary transport media are directly affected by the initial contaminant release and are dependent on the type of source and specific release mechanisms. Primary transport media for potential releases during D&D include air, surface water, soil, and groundwater.

Airborne transport may occur as a result of routine emissions; volatile emissions from a contaminated building structure (e.g., concrete flooring), soil, surface water, or from residual constituents in equipment, tanks, and piping; and from windblown surface soil migrating as fugitive dust. Airborne contaminants may be transported directly to a receptor or eventually be deposited to a secondary source such as surface soil, sediment, or surface water by particulate deposition, rain-out, or washout. Contaminants released directly to the soil can be transported to a secondary source by infiltration and

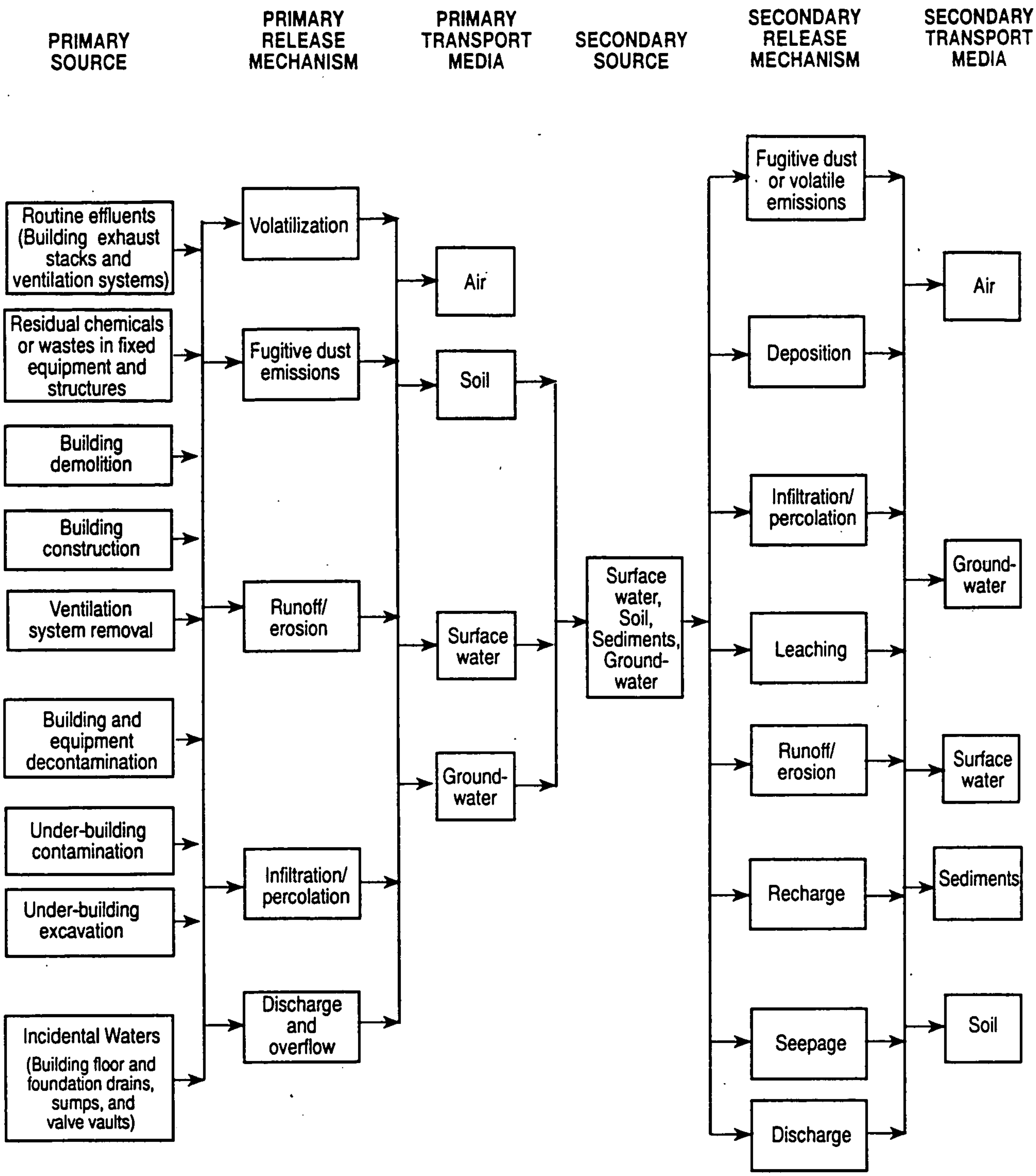


FIGURE 10-1
Industrial Area IM/IRA/DD
Future Conceptual Site Model Flow Diagram
D&D Activities Scenario

(qms) H:\WP\FLATS\FIG10-1.FH3

by D&D activities. The COPC list for environmental monitoring during D&D will be refined to apply to the specific building or area and D&D activity.

The primary sources of contamination associated with D&D activities will generally be areas where fixed or residual contaminants remain after transition phases have been completed. These potential sources may include (1) routine effluent emissions from building exhaust stacks and ventilation systems; (2) residual chemicals or waste in equipment, tanks, piping, and building structures; (3) incidental waters from building floor and foundation drains, sumps, and valve vaults; and (4) contaminated soils that may become exposed underneath buildings during D&D.

10.2 PATHWAYS

A transport or migration pathway consists of a release mechanism and transport media. The future conceptual site model identifies potential contaminant sources and transport pathways for D&D activities. Figure 10-1 presents the conceptual site model flow diagram for potential releases during D&D. Primary and secondary sources, release mechanisms, and transport media are identified in this figure. The release mechanisms for current activities and D&D activities are similar, except that D&D activities may introduce additional primary release mechanisms because of the nature of the activity performed. These release mechanisms would be the result of new and different types of activity conducted specifically during D&D. Figure 10-2 depicts the future conceptual site model.

10.2.1 Primary Release Mechanisms

The primary release mechanisms related to D&D activities are similar to those presented in Section 8.0. Primary release mechanisms presented in Section 8.0 that may also apply to D&D include (1) historical spills, leaks, or overflows; (2) volatilization

10.0 FUTURE CONCEPTUAL SITE MODEL

The future conceptual site model for the Industrial Area at RFP considers potential contaminant transport pathways associated with sources and conditions expected to exist during D&D of buildings and other facilities. This model differs from the model presented in Section 8.0, where current conditions and unplanned events are considered. The future model addresses potential contaminant releases in the Industrial Area after the transition phase described in Section 9.0 has been completed and D&D activities are under way. As discussed in Section 9.0, because activities planned for D&D currently are not well defined, a generalized approach to D&D activities is used to develop the future conceptual site model. The future conceptual model is based on the assumption that D&D activities will eventually require significant building disturbance and air, groundwater, and surface pathway protection, as discussed in Section 9.0. The models presented in Section 8.0 were the basis for the conceptualization of potential future contaminant migration presented in this section. Like the current and unplanned events models, the future model evaluates potential contaminant sources, release mechanisms, and transport media. Evaluation of potential exposure routes and receptors is not addressed in this IM/IRA/DD.

10.1 CONSTITUENTS OF POTENTIAL CONCERN AND SOURCES

The approach for identifying COPCs for environmental monitoring during D&D is described in Section 9.3. The approach evaluates constituents identified in OU-specific RFI/RIs and building characterization reports and uses screening methods to reduce the COPC list to a shorter, more precise list of indicators of contaminant release. As mentioned previously, the bulk of chemical products and hazardous wastes stored in buildings and tanks will be removed during transition. Additionally, internal decontamination will be completed before the structural integrity of a building is reduced necessary engineering controls to limit or eliminate potential releases and to identify the environmental monitoring necessary for verification that the engineering controls are effective. The COPCs selected for environmental monitoring conducted during D&D of a particular building, location, or area will be refined to a specific list appropriate to the activity. This will streamline monitoring efforts and allow more effective verification monitoring during D&D. As more information about the approach to and implementation of D&D becomes available, the conceptual site model will be updated.

10.3 RELATIONSHIP OF THE FUTURE CONCEPTUAL SITE MODEL TO DECONTAMINATION AND DECOMMISSIONING MONITORING PROGRAMS

Monitoring during D&D will include worker safety monitoring, activity-specific monitoring, and environmental verification monitoring. Worker safety monitoring may be used in the early identification of releases to the atmosphere and will consist of real-time measurements and monitoring that requires laboratory analysis. Activity-specific and verification monitoring may include real-time measurements and monitoring that requires laboratory analyses. Laboratory analysis typically provides better quality data, but this analysis takes several days. Activity-specific monitoring programs will be developed as D&D work packages are prepared and, therefore, are not presented in this IM/IRA/DD. Verification monitoring will be performed to verify measurements made with D&D activity-specific monitors and to verify that engineering controls and pathway protection procedures are functioning properly. Proposed actions for verification monitoring are summarized in Section 9.2.2.

The results of monitoring conducted during D&D activities can be evaluated to assess the effectiveness of existing pathway protection and environmental controls. This information may then be used to develop additional controls and monitoring, if warranted. In general, monitoring programs in use during D&D activities, combined with engineering controls and experience gained during transition, will reduce the potential for contaminant release.

10.4 SUMMARY

The future conceptual site model preliminarily identifies the potential sources where contaminants could be released, the potential release mechanisms and the likely transport media that could occur during D&D. This information will be used in planning the

- All nonfixed materials, equipment, chemicals, and wastes will be removed during facility transition and will, therefore, reduce the number of primary sources present during D&D, thereby eliminating the concern for potential releases.

- Transition will include thorough characterization of facilities.

- Engineering controls will be developed and implemented during D&D based on the transition assessments and planned activities, and will be designed to control any potential releases.

- Activity-, media-, and COPC-specific monitoring programs will be implemented before D&D begins, allowing early identification and response to releases.

10.2.4 Secondary Release Mechanisms

Secondary release mechanisms during D&D would be similar to the secondary release mechanisms described in Section 8.2.3. This section should be referred to for more information concerning potential secondary release mechanisms.

10.2.5 Secondary Transport Media

Transport continues as constituents migrate through the environment over time. Secondary transport media are those that receive contaminants released from a secondary source through a secondary mechanism. Secondary transport during D&D would be similar to the description for the current scenario provided in Section 8.2.4.

percolation, leaching, runoff, or erosion. Contaminants may be transported by surface water in overland flow or runoff when direct release to the surface occurs. Releases from below-ground tanks and piping, UBC, or buried sources may infiltrate into surrounding soils. UBC may be directly released to groundwater, and incidental waters may carry contaminants to the groundwater.

10.2.3 Secondary Sources

Contaminant migration is further characterized through identification of secondary sources. As defined in the current model, a secondary source is the medium that receives released constituents. Air is not considered a secondary source because it acts only as a transport medium to other media. Secondary sources in the Industrial Area include surface water, soil, sediment, and groundwater.

Surface water may be a secondary source for contaminant release because of (1) direct discharge to drainages from contaminated incidental waters, (2) release of building or equipment decontamination waters, (3) runoff from contaminated surfaces exposed during D&D, or (4) contaminated groundwater seeps into surface drainages. Surface soil, sediment, and subsurface soil may be secondary sources because they receive contaminants through erosion, runoff, infiltration, and percolation, as well as from air as particulate fallout, rainout, and washout. Groundwater may be a secondary source as a result of UBC.

In the past, some secondary sources were created because historical releases were not controlled by engineering controls or detected by monitoring systems. It is anticipated that secondary sources during D&D will be less likely to occur than in the past for the following reasons:

Section 11.0

11.0 IMPLEMENTATION PLAN

An IM/IRA verification monitoring system has been proposed to monitor D&D and other nonroutine activities that may affect groundwater, surface water, and air at RFP. The proposed actions for these potential pathways and an evaluation of the current site-wide monitoring systems are described in Sections 4.0, 5.0, and 6.0. The primary objective of the verification monitoring program is to provide a monitoring system for D&D activities that is more comprehensive than the occupational health and safety personnel monitoring network, located close to the activities, and more focused than the plant-wide monitoring programs. The Industrial Area fenceline will be a principal point of concern during the verification monitoring program.

As presented in previous sections, the existing monitoring programs combine the most desirable aspects of both a comprehensive and a focused monitoring network; therefore, the proposed verification monitoring program will primarily consist of existing media monitoring components. The primary additions to the existing monitoring programs may consist of (1) development of a specific list of COPCs associated with a particular D&D activity, (2) collection of a baseline data set if an existing database does not exist, and (3) expansion of certain aspects of current monitoring to provide more activity-specific results. Verification monitoring programs will be designed to verify measurements made for site-specific monitoring and to evaluate engineering and administrative control effectiveness. The goals of monitoring and controls are to detect and limit the release of COPCs that may affect human health and the environment.

Subtasks for implementation of monitoring, treatment, and disposition of incidental and foundation drain waters during D&D have also been identified and included in the implementation plan. These subtasks are primarily related to monitoring and disposition of such waters to ensure that they will not be released to the environment without proper characterization and necessary treatment.

The following sections present the implementation plan for verification of groundwater, surface water, and air monitoring and for incidental water treatment during D&D activities. Subtasks for each of these media that correspond to proposed verification monitoring actions, have been identified and listed to represent a phased-implementation approach. All environmental monitoring activities performed under this Industrial Area IM/IRA Program will be in accordance with established Rocky Flats standard operating procedures.

11.1 GROUNDWATER IMPLEMENTATION PLAN

An ongoing quarterly and event-triggered monthly groundwater monitoring program is proposed for the Industrial Area to detect releases from D&D activities that may impact groundwater. Groundwater verification monitoring may consist of both temporary well points installed near the D&D site and new and existing monitoring wells located between the D&D site and the Industrial Area fenceline. These wells are described in Section 4.0. Well points will constitute the first line of detection for any gross changes in groundwater quality, and the monitoring wells will provide a means of evaluating the extent and chemical character of any detected contamination, as well as provide ongoing monitoring of Industrial Area pathways.

For each major D&D site, a set of monitoring wells will be identified to detect contamination within the upper hydrostratigraphic unit. The monitoring wells will be selected from existing wells and new wells proposed in Section 4.0. This set of monitoring wells will monitor the D&D site in both an upgradient and downgradient direction to distinguish between contamination originating from outside the D&D site and contamination originating directly from the D&D activity. Monitoring wells selected for each site will be located as close as possible to the D&D site to detect contamination as quickly as possible, and baseline chemical data will be established for each of the existing and newly installed monitoring wells. Baseline data for existing wells will be compiled using quarterly sampling results from the previous three-year period. For newly constructed monitoring wells, the baseline data set will be compiled using quarterly groundwater results available at the start of the D&D activity. As presented in Section 4.0, 11 new alluvial monitoring wells will be installed to monitor pathways not currently addressed by the present groundwater monitoring network.

Well points will be installed as close as practicable to the D&D site given the constraints of D&D equipment traffic and other related activities. Although well points will be installed in both downgradient and upgradient locations, the main purpose of the well points is early detection of groundwater impacts from D&D activities; therefore, well points will be concentrated in the downgradient direction.

Well points will be installed solely to closely monitor D&D activities and will only be installed when there is the potential for significant impacts to groundwater from these activities. The well points will be included in the current quarterly sampling program, and results from the quarterly monitoring that are available at the startup of D&D activity will constitute the baseline data set. Well points and monitoring wells will be monitored for a period sufficient to detect a release after conclusion of a D&D activity. The time sufficient to detect a release to groundwater during the final stages of D&D work will be based on local hydrogeologic conditions and the nature of a potential release (e.g., magnitude and duration).

Implementation of proposed groundwater verification monitoring includes the following subtasks:

- Install Proposed Monitoring Wells. The 11 new monitoring wells described in Section 4.0 will be installed to address additional data needs in the current Industrial Area monitoring network. Installation will include developing a statement of work and selecting subcontractors to construct the wells. The new monitoring wells will be installed within 18 months of approval of this document.

- Collect Baseline Data for New Wells. New monitoring wells will be incorporated into the quarterly groundwater sampling program after installation. Before D&D activities begin, available results will be extracted from RFEDS, and the mean, warning limits, and control limits will be calculated for COPC concentrations detected in the water from each new well. The quarterly groundwater analytes will constitute the list of COPCs.

- Identify D&D Activities that will Require Groundwater Monitoring. When a D&D schedule is available, the activities and procedures will be reviewed and evaluated to determine which activities and locations will require groundwater monitoring. Locations that are identified for groundwater monitoring will be evaluated to select existing and new monitoring wells that are appropriate for inclusion in the verification monitoring program. Well point locations will be identified near the D&D activity based on the configuration of the area, equipment placement, and other physical constraints.

- Collect/Compile Baseline Data for Existing Wells. For existing monitoring wells selected for verification monitoring in the Industrial Area, historical data from quarterly sampling will be extracted from RFEDS for the previous three years, if available. These data will constitute the baseline data set. The mean, warning limits, and control limits for COPC concentrations will be calculated for each existing well as described in Section 9.4. The quarterly groundwater analytes will constitute the list of COPCs.

- Install Well Points. After locations have been identified, the subcontractor will install well points near the D&D activity.

- Collect Baseline Data for Well Points. New well points will be incorporated into the quarterly groundwater sampling program after installation. Before D&D activities begin, available results will be extracted from RFEDS, and the mean, warning limits, and control limits will be calculated for each well point.

- Implement Verification Monitoring Program. If required during the D&D activities, groundwater samples will be collected from the monitoring wells selected for the specific verification monitoring program and for well points, if installed. These samples will be collected as part of the existing quarterly groundwater sampling program currently in place at RFP. The sample results will be extracted from RFEDS when they are available and compared to the statistical warning and control limits.

If the results indicate that sample concentrations are less than warning limits, then quarterly sampling and data review will continue throughout the D&D activity and after the D&D activity to ensure that a potential release will be detected if it were to occur on the last day of the activity. If results indicate that sample concentrations are greater than warning limits, then the preprogrammed response described in Section 9.0 will be implemented.

11.2 SURFACE WATER IMPLEMENTATION PLAN

A surface water monitoring program is proposed for the Industrial Area that will support upgrades to the current program and provide appropriate verification monitoring during D&D activities. The monitoring program will include (1) six of the seven pathways for runoff from the Industrial Area, (2) the outfalls of subbasins that drain into the six pathways within which D&D activities are taking place, and (3) locations near historically identified contaminated seeps, as necessary. The objective of the proposed surface water verification monitoring program is to ensure that D&D activities and other nonroutine activities that may affect surface water in the Industrial Area are adequately monitored.

COPC lists will be developed for each drainage subbasin where D&D activities occur. The list of COPCs will be determined using selected sets of historical data from past and present monitoring programs, as well as additional baseline data collection to supplement the historical data set.

11.2.1 Industrial Area Outfall Monitoring

Characterization of surface water as it exits the Industrial Area is a key task for monitoring the effects of D&D and other nonroutine activities. Since existing monitoring programs were designed to meet specific regulatory objectives, primarily at the RFP fenceline, the Industrial Area is not adequately equipped to monitor the outflow of surface water in the vicinity of the Industrial Area fenceline. The first tier in the proposed monitoring program is to monitor surface water in the Industrial Area's major drainage pathways. The objective of the Industrial Area outfall monitoring program is to characterize surface water leaving the Industrial Area. As presented in Section 5.0, six of the seven major surface water pathways from the Industrial Area will be incorporated into current monitoring programs.

Available historical data from past and present monitoring programs will be used to characterize Industrial Area storm flow. The objective of this characterization will be to compile baseline concentrations for the NPDES analyte list. A monitoring program will then be developed to monitor and sample surface water exiting the Industrial Area. Results from the monitoring program will be compared with warning and control limits to identify potential environmental releases from D&D and nonroutine activities.

Implementation of these proposed outfall monitoring actions will include the following:

- Evaluate Pathways and Outfalls and Determine Appropriate Monitoring Equipment. Within 18 months following approval of this document, current Industrial Area outfalls will be identified and evaluated for proposed monitoring and sampling equipment.

- Establish Baseline Concentrations for the NPDES Analyte List Using Available Historical Data. Using results from past and current Industrial Area outfall monitoring stations, baseline concentrations will be compiled for each outfall in the Industrial Area.

- <u>Develop a Monitoring Program for Industrial Area Outfalls</u>. As discussed in Section 5.0, surface water automated sampling stations and flow meters will be installed within the six major drainage pathways (within 18 months of approval of this document). These stations will also support the NPDES and event-related monitoring programs. This program will include any necessary baseline data collection and continue throughout D&D activities.

This implementation plan is based on the assumptions that historical data from past and current monitoring programs are validated and that approved methods were used for analyses.

11.2.2 Subbasin Boundary Monitoring

Twenty-seven subbasins in the Industrial Area comprise the six major drainage pathways of concern. The primary objective of the subbasin monitoring program is to detect potential releases at the Industrial Area fenceline. To support this objective, monitoring near the D&D activity may provide the opportunity for early intervention if the activity affects surface water. The second tier of the proposed monitoring program is to equip the subbasins with monitoring equipment to provide the capability to detect and investigate potential releases closer to potential sources.

Currently, historical data for the subbasins are incomplete and subbasin baseline conditions have not yet been characterized. The installation of the subbasin monitoring stations will occur before D&D activities so that baseline data can be collected. The contribution that each subbasin makes to the total discharge of surface waters at RFP has also not been determined. Installing real-time monitoring devices for D&D verification monitoring will provide subbasin flow information. This program will be implemented for large-scale D&D activities or in instances where the D&D activity has the potential to cause a release to surface water.

Implementation of the proposed subbasin boundary monitoring actions includes the following:

- Identify Potential Subbasins to be Monitored and Develop Subbasin COPC Lists. Within 18 months following identification of D&D activities, subbasins that will be affected by the D&D activity will be identified and COPC lists for potentially affected subbasins will be developed using the methodology presented in Section 9.0.

- Determine Subbasin Monitoring Station Locations. Existing monitoring station locations will be compared with outfalls of the subbasins to determine what subbasins might have been or are currently being monitored. This subtask will ensure proposed monitoring equipment installation for baseline data collection is not being duplicated. Existing equipment will be inventoried, and additional equipment will be selected. As discussed in Section 5.7, monitoring equipment placement will also be based on a subbasin's ability to produce adequate sample volumes for analysis of COPCs.

- Prepare Construction Plans and Funding Requests for Monitoring and Sampling Equipment. Flow control structures will be designed and the current radiotelemetry system will be evaluated to determine if upgrades to the stations are necessary. Permits will be obtained for all construction activities.

- Install Verification Monitoring Equipment. Flow structures will be constructed and flow meters, monitoring equipment, and radiotelemetry equipment will be purchased and installed based on the schedule for D&D activities.

- Collect Baseline Data. If historical data are not available for specific COPCs then, if possible, data will be collected using automated samplers for up to 18 months before the start of D&D activity to establish baseline concentrations.

- Review Data. The baseline data will be reviewed, summarized, and evaluated to determine statistical warning limit and control limit concentrations of COPCs.

- Implement Verification Monitoring. Once D&D activities begin, surface water verification monitoring will consist of flow-dependent routine manual grab samples, real-time monitoring of water quality parameters (perennial stream conditions only), surface water flow, and automated sampling during potential release conditions, as discussed in Sections 5.0 and 9.0.

This implementation plan is based on the assumption that subbasins will occasionally have enough flow to allow for sample collection.

11.2.3 Seeps and Springs

Seeps have been previously identified and observed to discharge into surface water locations in the Industrial Area, thereby potentially contributing to surface water contamination. The origins of the seeps are assumed to be primarily from two main sources: groundwater and incidental/foundation waters.

There has been considerable sampling and analysis of seeps in the Industrial Area during the past three years. The seeps flow intermittently and predominantly during spring when high groundwater conditions occur or immediately after storm events. The review of seep data is important to determine if additional monitoring is necessary for potential contamination leaving the Industrial Area.

Implementation of the proposed monitoring of seeps and springs will include the following:

- Extract and Review Historical Valid Analytical Data from RFEDS. Chemical concentrations from seep samples and areas of potential contaminant sources will be evaluated. Data will be reviewed for COPC concentrations, groundwater baseline data, and surface water background concentrations. These activities will be performed within 12 months of approval of this document.

- Perform Confirmation Monitoring of Seeps Suspected of Issuing Water with Significant Concentrations of COPCs. Additional sampling may be necessary if analytical data gaps for seeps are discovered during the review of existing data. Confirmation sampling may also be necessary if there is potential for physical (building/topographical) or chemical changes (trend analysis) in the seep area.

- Develop and Implement a Seep Monitoring Program. A program to establish seep locations and frequency of monitoring, if necessary, for seeps suspected of issuing water with significant concentrations of COPCs will be developed. Locations for monitoring, if needed, will be based on factors such as concentrations relative to background surface water concentrations and historical information.

- Evaluate Seep Contamination. If seeps are found to be potential contaminant sources, they will be investigated using historical information and data from proposed monitoring activities.

- Evaluate Mitigative Measures. Based on the results from the investigation of potential sources of contamination in seeps, mitigative measures will be evaluated to determine their practicality and appropriateness.

This implementation plan is based on two assumptions: (1) the future NPDES permit will not contain additional requirements for seep monitoring, and specific seep discharges will not be point sources for effluent monitoring and (2) previously collected seep data are complete for all suspected seep areas and COPCs.

11.3 AIR IMPLEMENTATION PLAN

An IM/IRA air monitoring program is proposed for the Industrial Area to detect potential releases to air during D&D and other nonroutine activities. As described in Section 6.0, the IM/IRA air verification monitoring program will consist primarily of (1) air samplers that are currently part of the extensive plant-wide air monitoring program and located at the Industrial Area fenceline, and (2) four Summa™ canisters co-located with existing samplers at the Industrial Area fenceline.

The list of COPCs for each D&D activity will be determined using the methodology described in Section 3.0. Potential airborne COPCs associated with historical use of the buildings and subbasins in the Industrial Area include metals, VOCs, particulates, and radionuclides. Although there are existing air monitoring programs to detect particulate and radiological releases at the fenceline, measurements of VOC and metals concentrations in air have not been made in the Industrial Area, ~~with the exception of VOCs for occupational~~ safety monitoring. Collection of air samples is proposed before D&D activities begin to establish baseline concentrations of potential contaminants, and after D&D activities begin to support the verification monitoring program.

As presented in Section 6.0 and above, four existing RAAMP locations at the Industrial Area fenceline are proposed for collecting baseline and verification monitoring data. Summa™ canisters will also be placed at each of these four locations for both baseline and verification VOC sample collection. These sampler locations were selected based on their proximity and orientation relative to the Industrial Area. EPA methods will be used to analyze the samples.

Data will be collected periodically throughout D&D activities to determine if concentrations of COPCs are above warning limits.

Implementation of the air monitoring program will include the following subtasks:

- Develop COPC List. The schedule and types of D&D activities will be reviewed to screen a COPC list that will require baseline data. The COPCs will be identified using methodology presented in Section 3.0. This subtask includes evaluating D&D activities, building histories, and subbasin characteristics to determine specific analytes of concern for the D&D program. This subtask will be accomplished within 18 months following identification of a D&D site, if possible.

- Prepare/Procure Equipment and Review Methods. Summa™ canisters now in storage at RFP will be inspected to determine if any additional canisters will be required for baseline and verification monitoring. EPA analytical methods will be reviewed to ensure that all COPCs are addressed. Sampling personnel will be trained to use the canisters, if necessary. Laboratory personnel will review the analytical methods and associated quality assurance procedures. All monitoring equipment will undergo an operational check before baseline data collection begins.

- Install Summa™ Canisters. Summa™ canisters will be installed at the four RAAMP sites (Section 6.0) within 12 months of approval of this document.

- Collect Baseline Data. At the four Summa™ canister Industrial Area fenceline locations specified previously and at new RAAMP sampler locations (Section 6.0), samples will be collected to compile a baseline data set. Baseline data will be collected for at least one year. Data validation will be coordinated as data sets become available.

- Review Data. The baseline data will be reviewed, summarized, and evaluated to determine statistical warning limit and control limit concentrations for COPCs. Recommendations will be made if there is a need for additional samplers.

- Review Release Detection Resources. Computer models will be evaluated to determine capabilities for release detection, plume migration simulation and availability based on program needs.

- Implement Verification Monitoring. Verification samples will be collected periodically during routine operating conditions to verify that the environmental protection systems are functioning as designed. In the event that COPCs are detected above warning limit concentrations, results from verification monitoring will be used to determine if any releases to air have occurred as a result of D&D activities.

11.4 INCIDENTAL AND FOUNDATION WATERS IMPLEMENTATION PLAN

Incidental and foundation waters may potentially become contaminated from contact with hazardous materials in buildings, IHSSs, other historical release areas, or contamination from under the buildings. It may be necessary to collect and treat these waters before they enter the environment. Based on the additional data needs and proposed actions presented in Sections 7.5 and 7.6, monitoring and disposition subtasks have been identified in the following subsections to address incidental and foundation waters during D&D activities.

11.4.1 Monitoring

The following subtasks have been identified to address monitoring of incidental and foundation waters during D&D activities.

- Field Check Sump Discharge Destinations. The sump discharge flow paths will be verified.

- Sample Foundation Drains and Measure Flow Rates. Foundation drains will be monitored quarterly for flow and water quality. Foundation drain monitoring will be conducted according to the OU8 Technical Memorandum (EG&G 1994).

- Append the *Control and Disposition of Incidental Waters* (CDIW) Document. The CDIW will be appended to include a more detailed analyte list for characterization of valve vault water.

- Revise Field Documentation Procedure. Field documentation for sampling and monitoring will be revised to include dates, volumes, water quality parameters, and flow. These records will be managed in a document control system.

- Append the Surface Water Management Plan. The Surface Water Management Plan will be appended to monitor all foundation drains and building sumps not previously identified.

11.4.2 Disposition

The following subtasks have been identified to address the disposition of incidental and footing drain waters. These tasks are based on the current RFP treatment facilities discussed in Section 7.4.

- Evaluate Pretreatment Technologies. Based on the COPC concentrations anticipated from specific buildings, evaluations of pretreatment technologies will be conducted in concert with any modifications planned for the various water treatment systems.

- Implement Pretreatment Technologies. Based on the evaluation of pretreatment technologies and types of COPCs, appropriate pretreatment technologies may be implemented, as necessary.

- Prepare Procedures for Routing Incidental Waters to the Appropriate Treatment Facility. Procedures will be prepared for determining which incidental waters require treatment and the logistics of routing incidental waters to the appropriate treatment facilities.

- Implement Incidental Water Treatment. After incidental and foundation drain waters have been characterized, they will be routed through the appropriate treatment facility, as necessary.

- Install the WWTP Influent/Effluent Storage Tanks. Two sets of storage tanks will be installed at the WWTP. The first set of tanks will contain approximately 320,000 gallons of influent storage. The second set will contain approximately 550,000 gallons of effluent storage. It is currently projected that the tank design, construction, and implementation would take approximately 40 months. For planning purposes, the anticipated start date for this tank project will be during the second quarter of fiscal year 1995.

11.5 REFERENCES

EG&G Rocky Flats, Inc. 1994 (April). *Technical Memorandum Number 1, Data Compilation, Operable Unit 8, 700 Area*. Two Volumes. Draft. Prepared by Jacobs Engineering Group Inc.

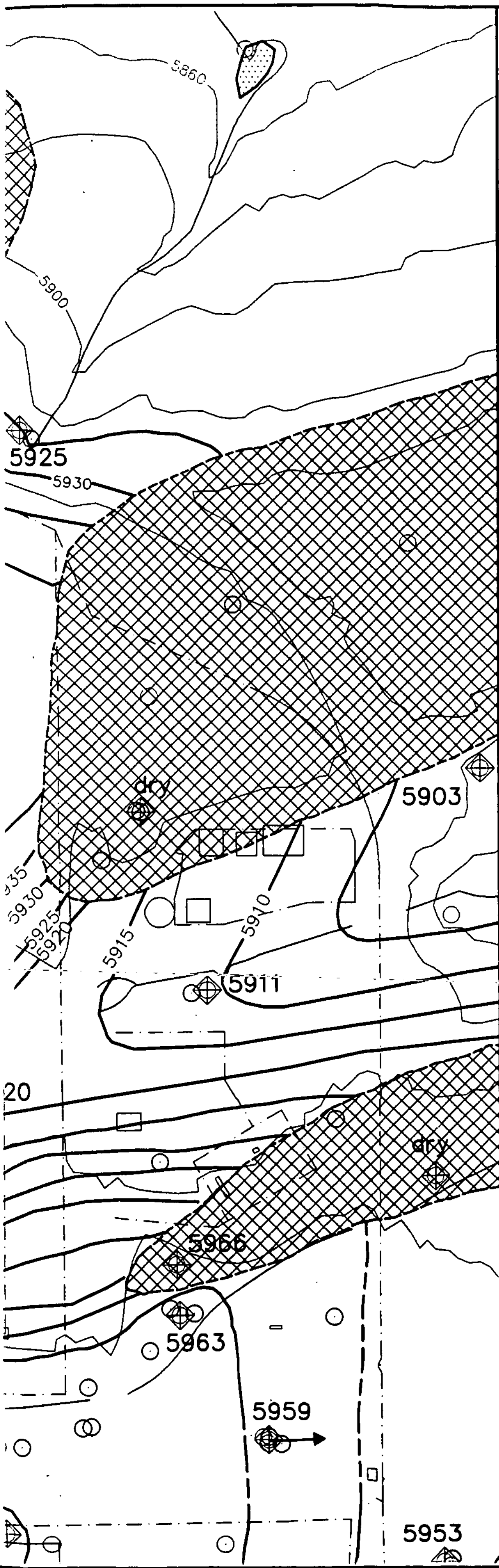


PLATE 4-1
INDUSTRIAL AREA IM/IRA/DD
Groundwater Configuration
of the Alluvial Component of the
Upper Hydrostratigraphic Unit
Spring 1992
and Proposed IM/IRA
Monitoring Wells

EXPLANATION

Wells Used in Map Construction

Other Alluvial Wells

Other Bedrock Wells

A Proposed Monitoring Well

Approximate Extent of Unsaturated Areas

5955 Groundwater Elevation
(feet above mean sea level)
Dashed where inferred

Stream or Drainage

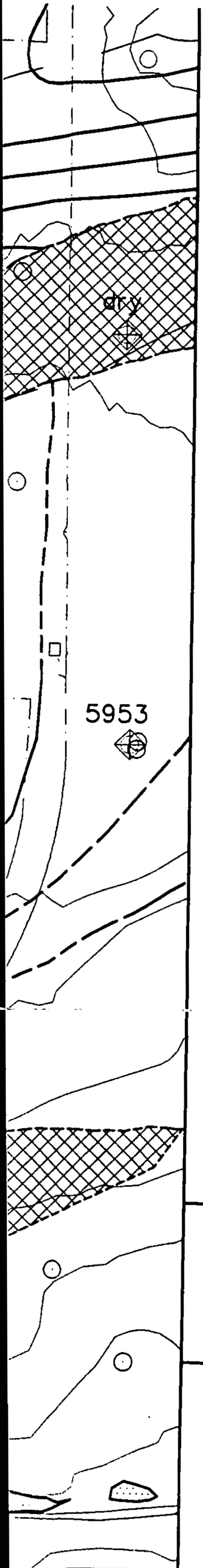
5960 Topographic Contour
(Contour Interval 20 feet)

Building

Fence

Generalized direction of horizontal groundwater flow

Seeps/Wetlands



(feet above mean sea level)
Dashed where inferred

Stream or Drainage

5960 Topographic Contour
(Contour Interval 20 feet)

Building

Fence

Generalized direction of horizontal groundwater flow

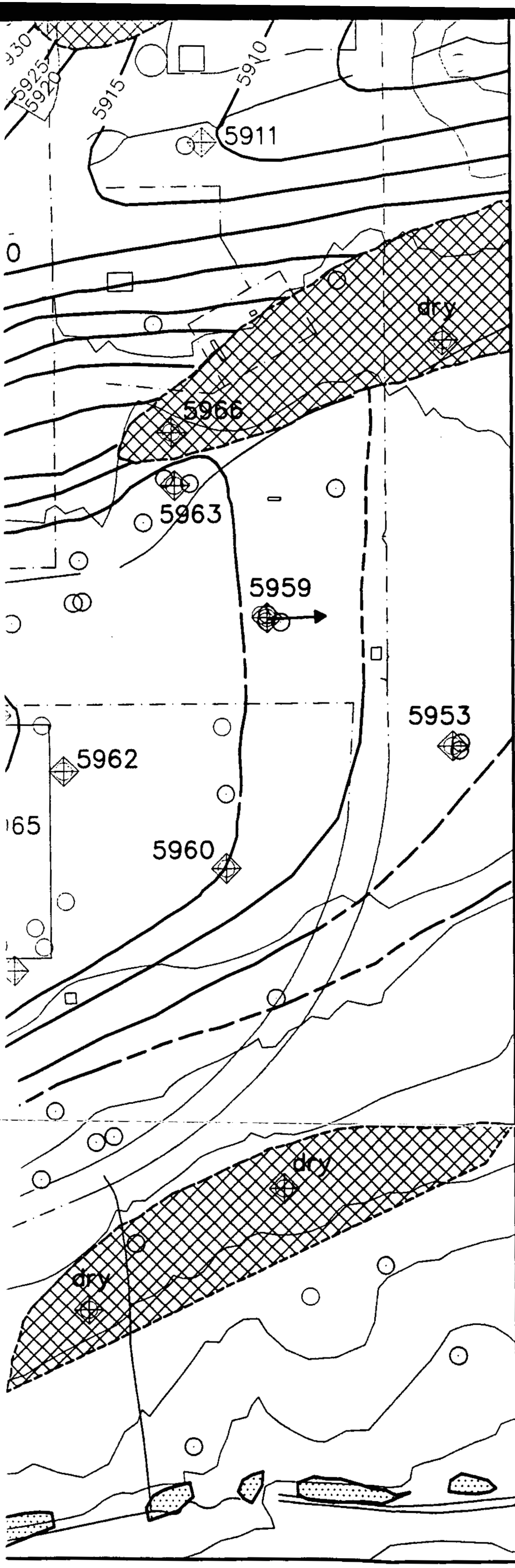
Seeps/Wetlands

N

200 100 0 200 400 feet

U.S. Department of Energy
Rocky Flats Plant

EG&G ROCKY FLATS
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464



(feet above mean sea level)
Dashed where inferred

Stream or Drainage

5960 Topographic Contour
(Contour Interval 20 feet)

Building

Fence

Generalized direction of horizontal groundwater flow

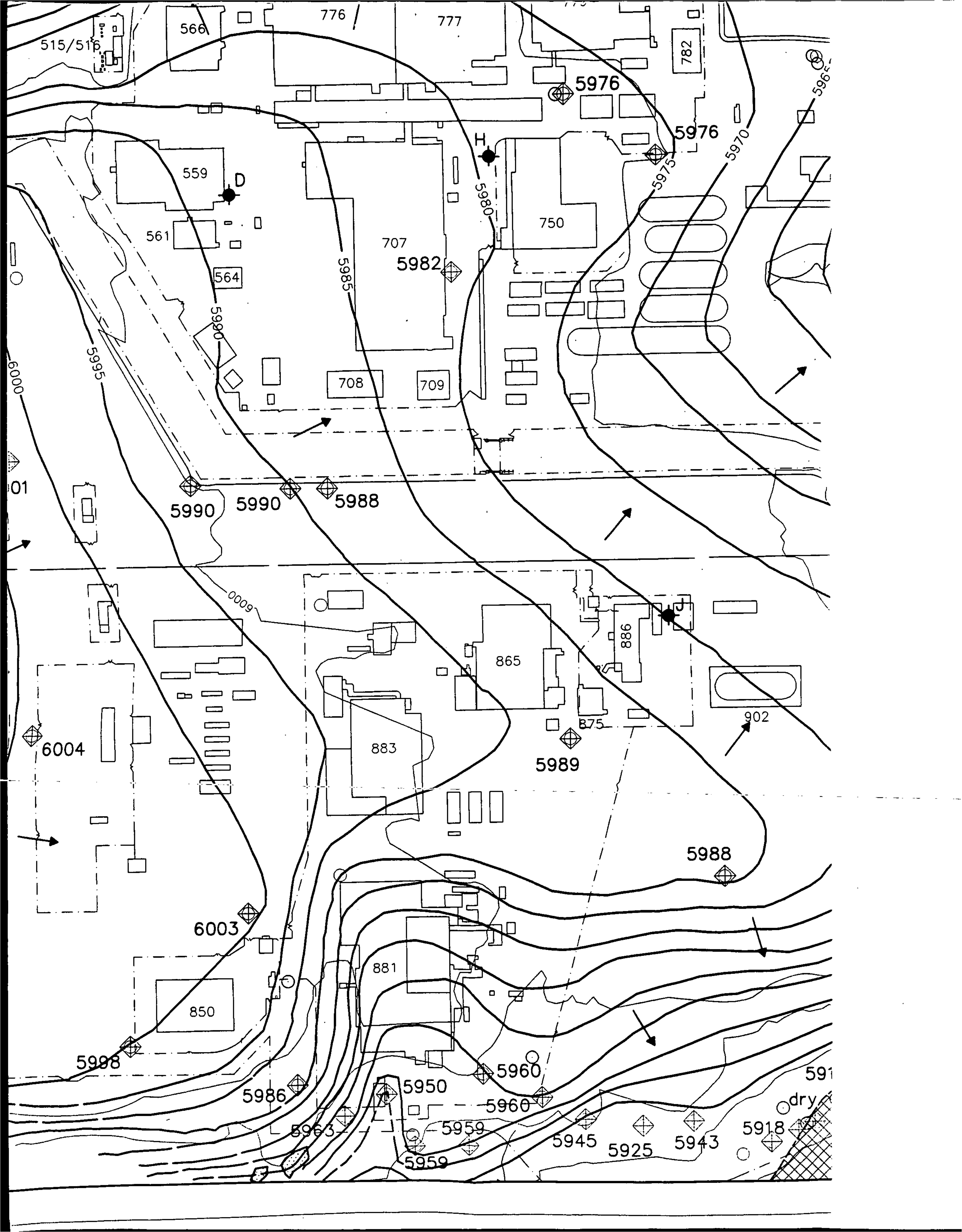
Seeps/Wetlands

N

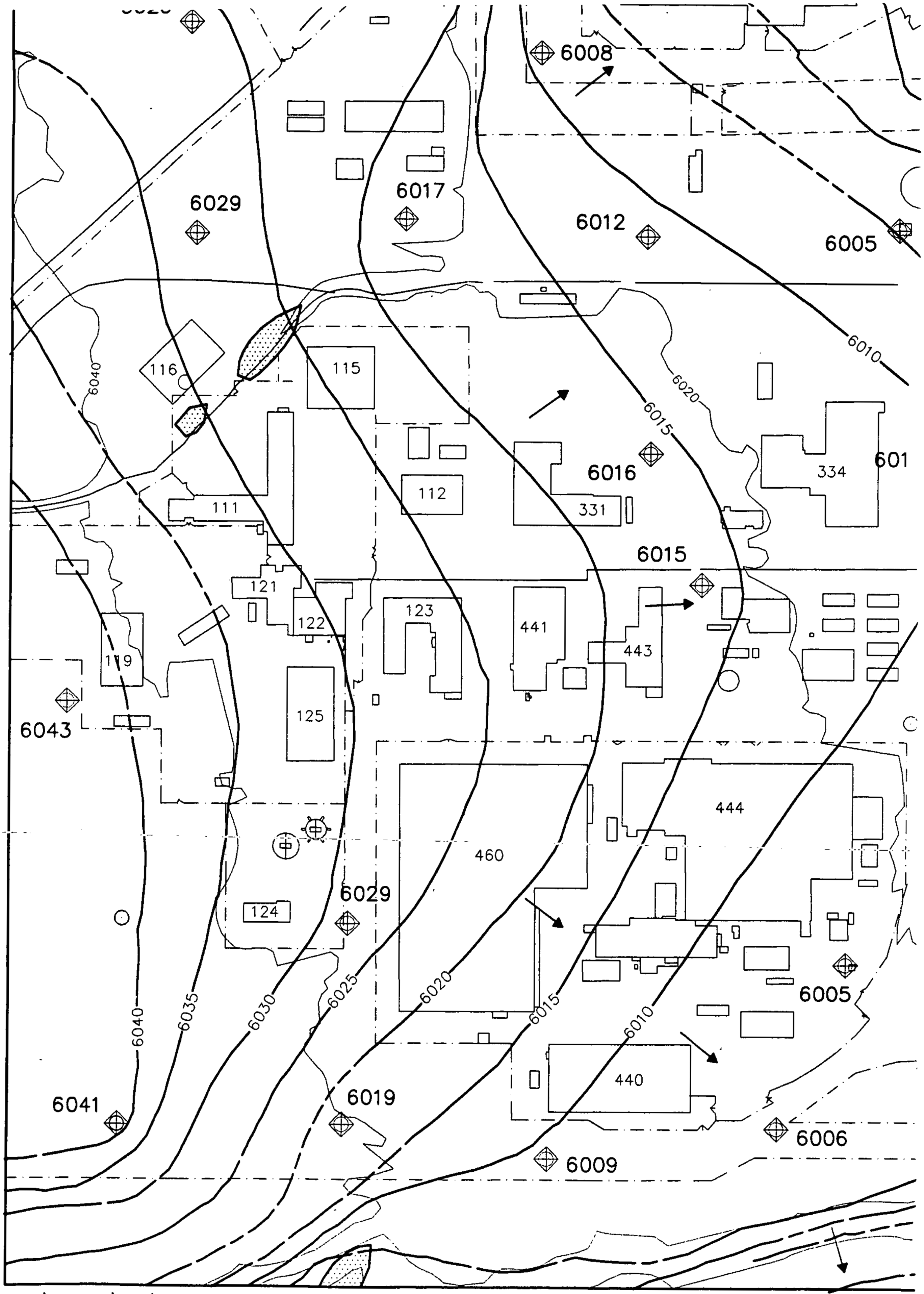
200 100 0 200 400 feet

U.S. Department of Energy
Rocky Flats Plant

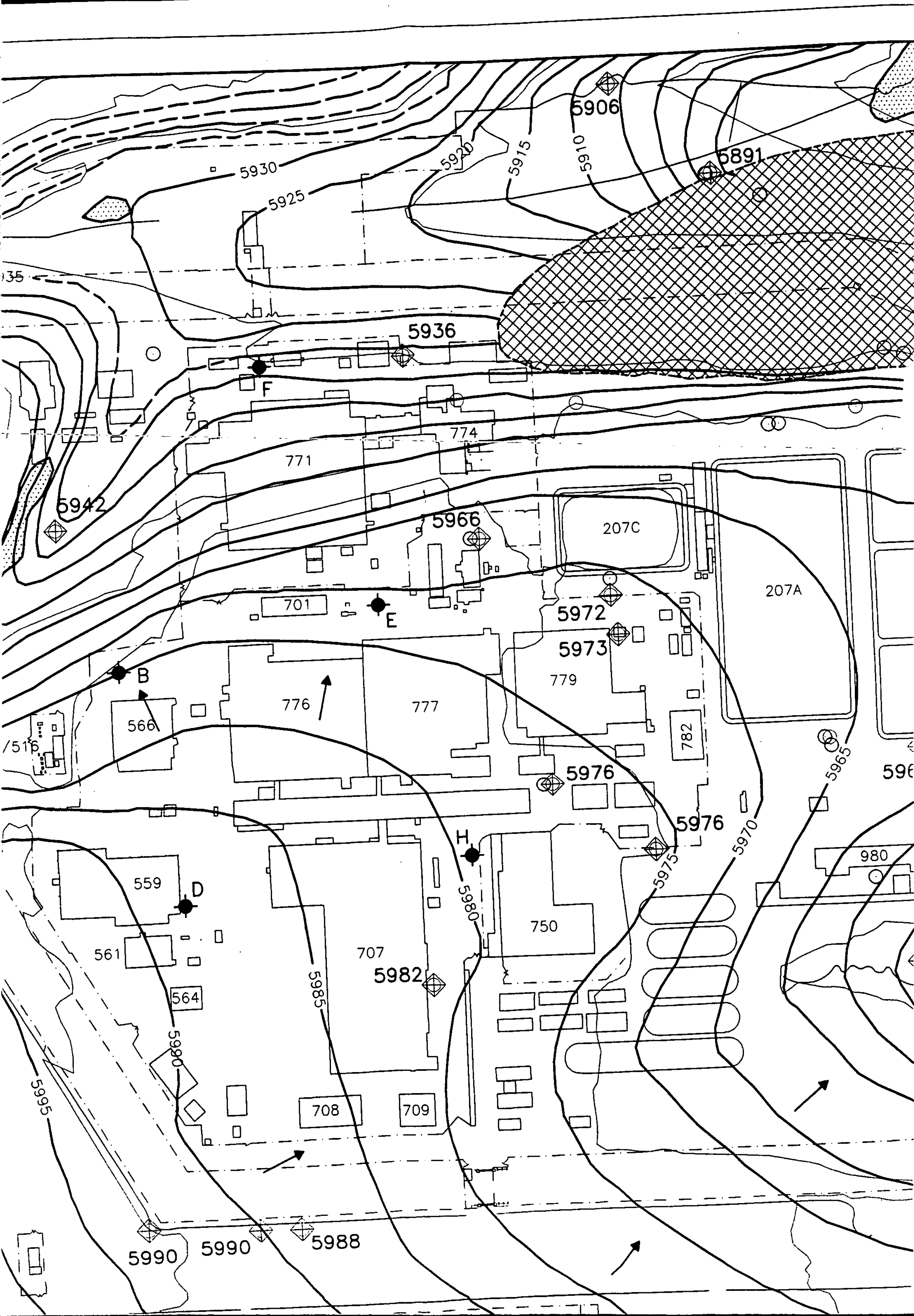
EG&G ROCKY FLATS
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

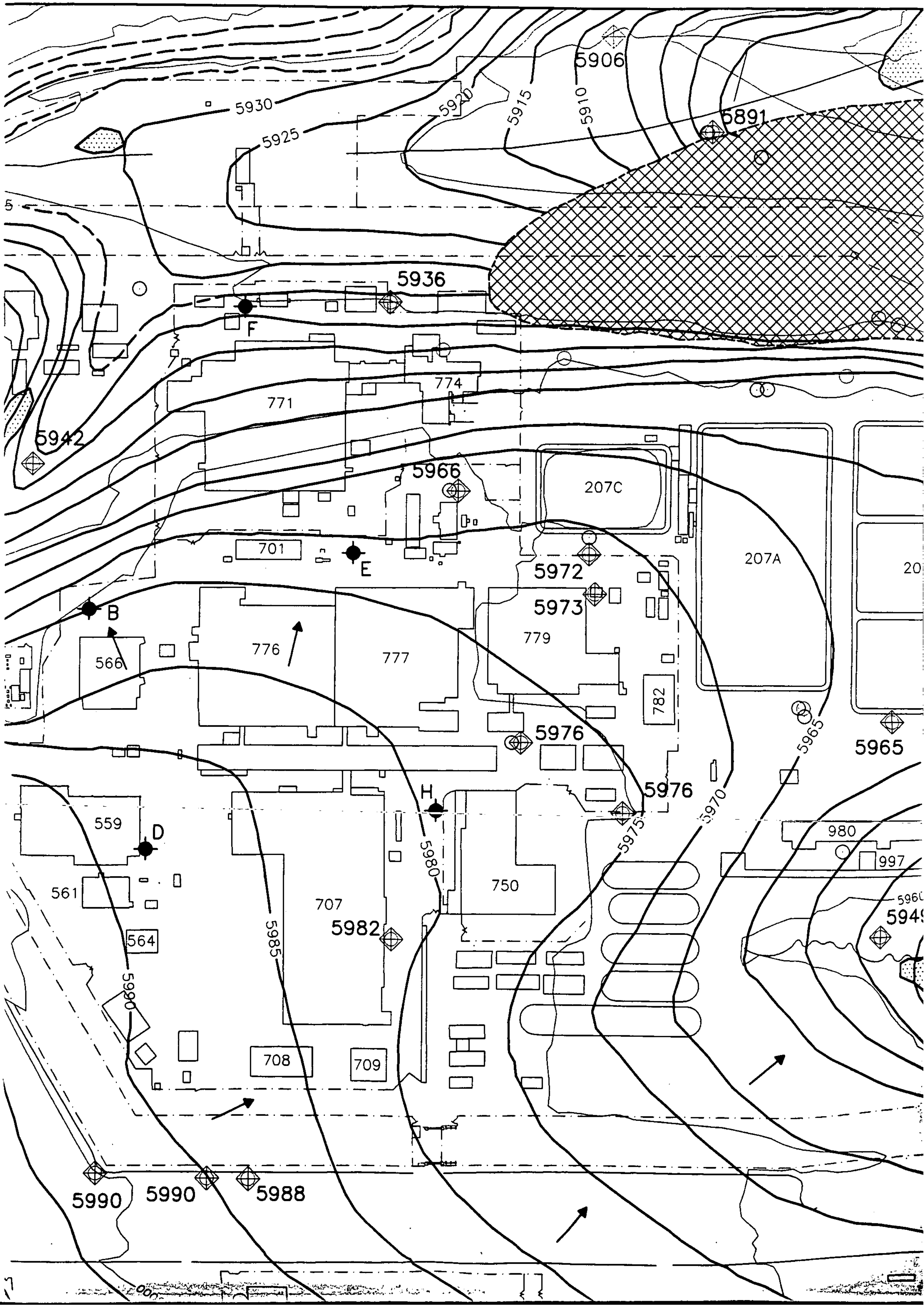


776
777
566
515/516
782
5976
5976
H
D
559
561
564
707
5982
750
708
709
5990
5990
5988
5985
5980
5975
5970
5995
6000
6004
J
886
865
883
875
902
5989
5988
6003
881
850
5998
5986
5960
5950
5960
5963
5959
5959
5945
5925
5943
5918
dry

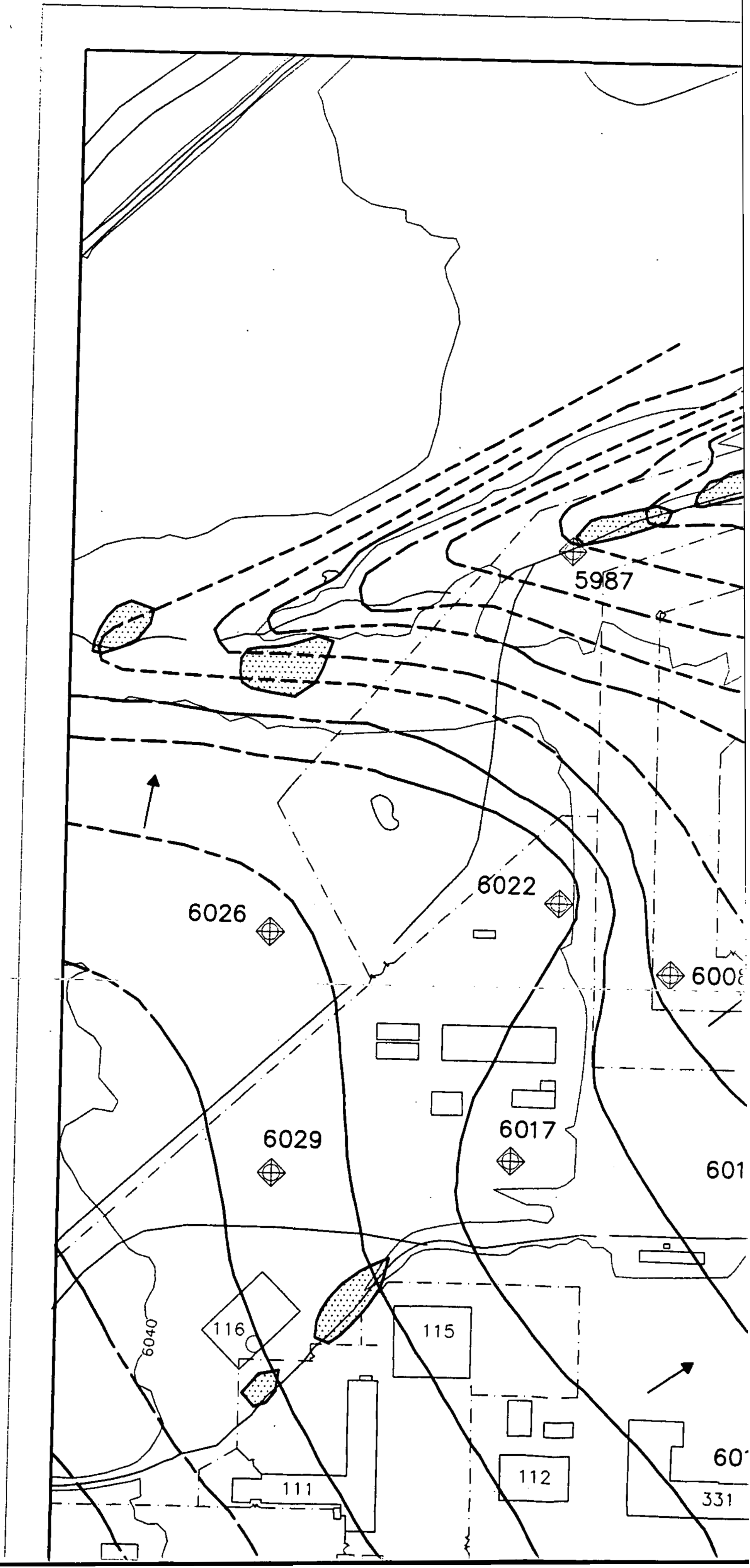


c: \rflats\sw\swplt41a.dwg 05H60300

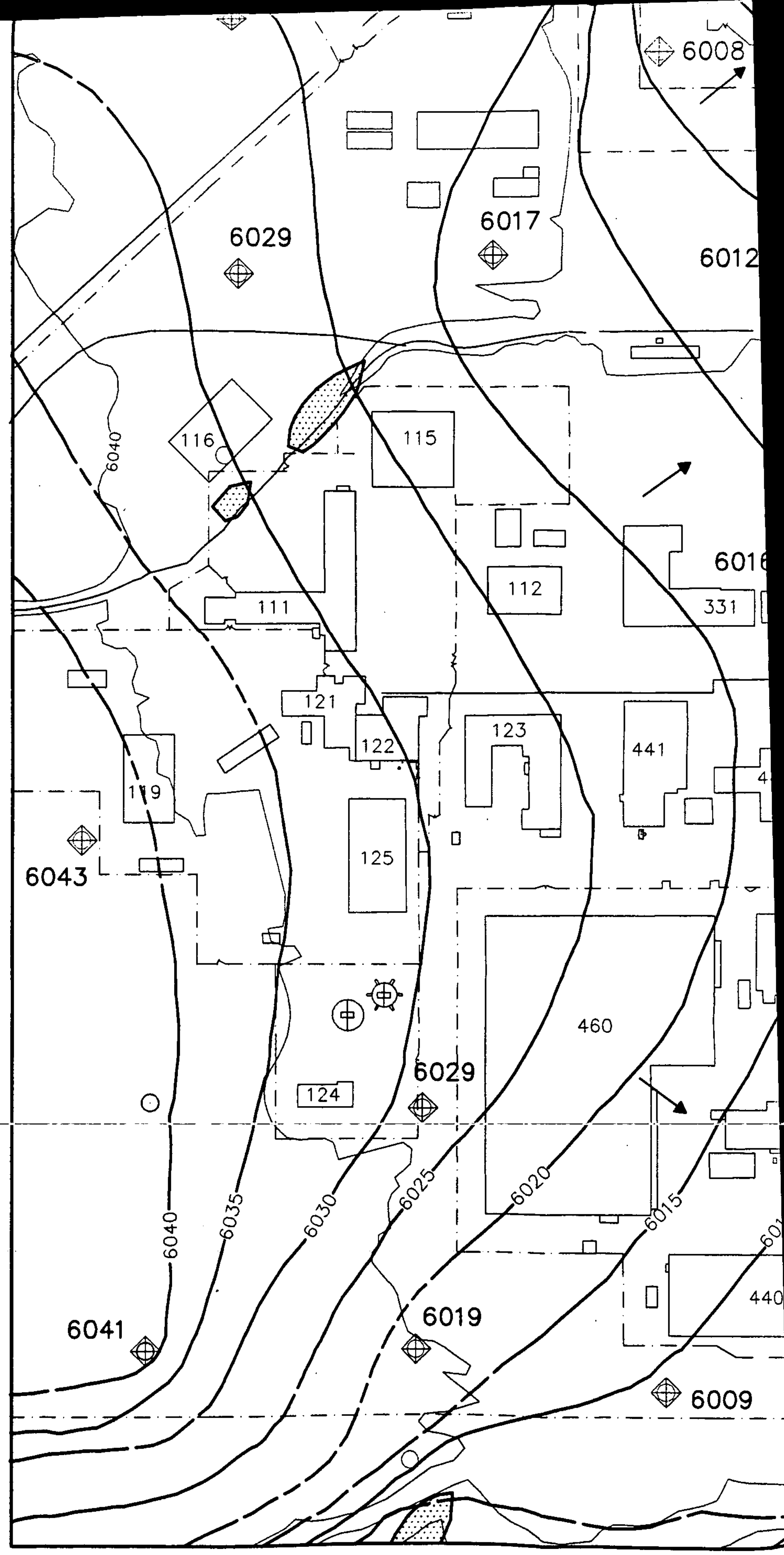

5930
5925
5920
5915
5910
5906
5891
935
5936
F
774
771
5942
5966
207C
207A
701
E
5972
5973
779
B
776
777
566
516
782
5976
5965
596
5976
5970
980
H
559
D
5975
5980
750
561
707
5982
5985
564
5990
5995
708
709
5990
5990
5988



5930
5925
5920
5915
5910
5906
5891
5936
F
771
774
5942
5966
207C
207A
701
E
5972
5973
B
779
566
776
777
782
5976
5965
5976
H
559
D
980
997
5980
5975
5970
5965
561
707
750
5960
5982
564
5985
5990
708
709
5990
5990
5988



5987
6022
6026
6008
6029
6017
6040
116
115
111
112
331



c:\rflats\sw\swplt41a.dwg 05H60300

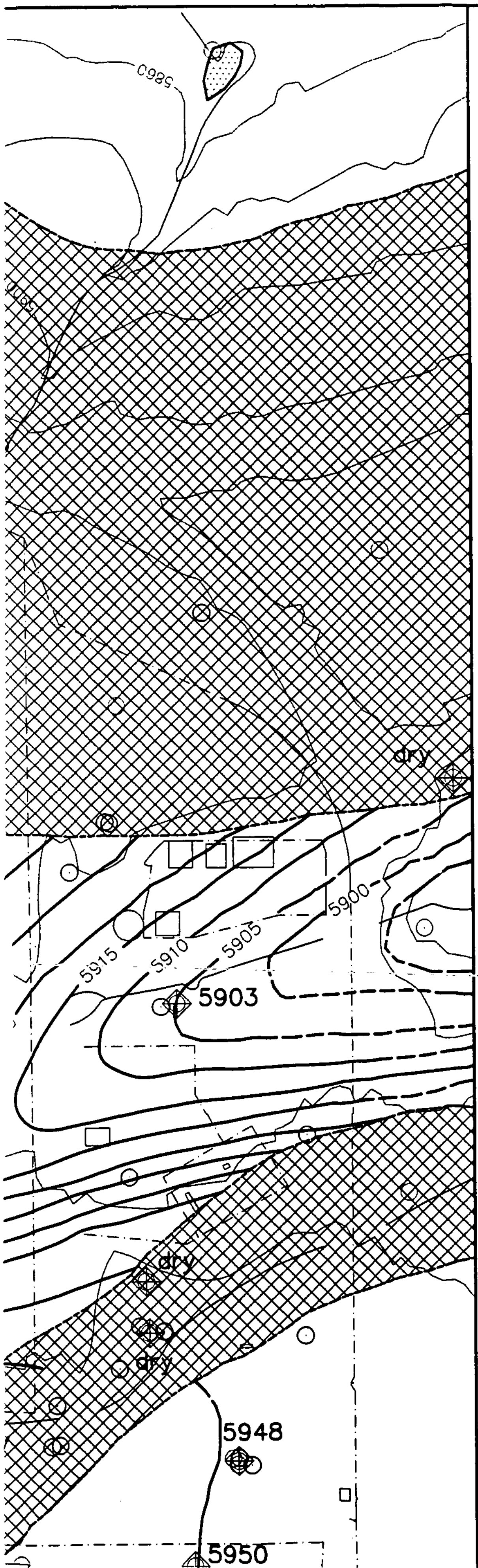


PLATE 4-2
INDUSTRIAL AREA IM/IRA/DD

Groundwater Configuration of the Alluvial Component of the Upper Hydrostratigraphic Unit Fall 1992

EXPLANATION

Wells Used in Map Construction

Other Alluvial Wells

Other Bedrock Wells

Approximate Extent of Unsaturated Areas

5955 Groundwater Elevation (feet above mean sea level) Dashed where inferred

Stream or Drainage

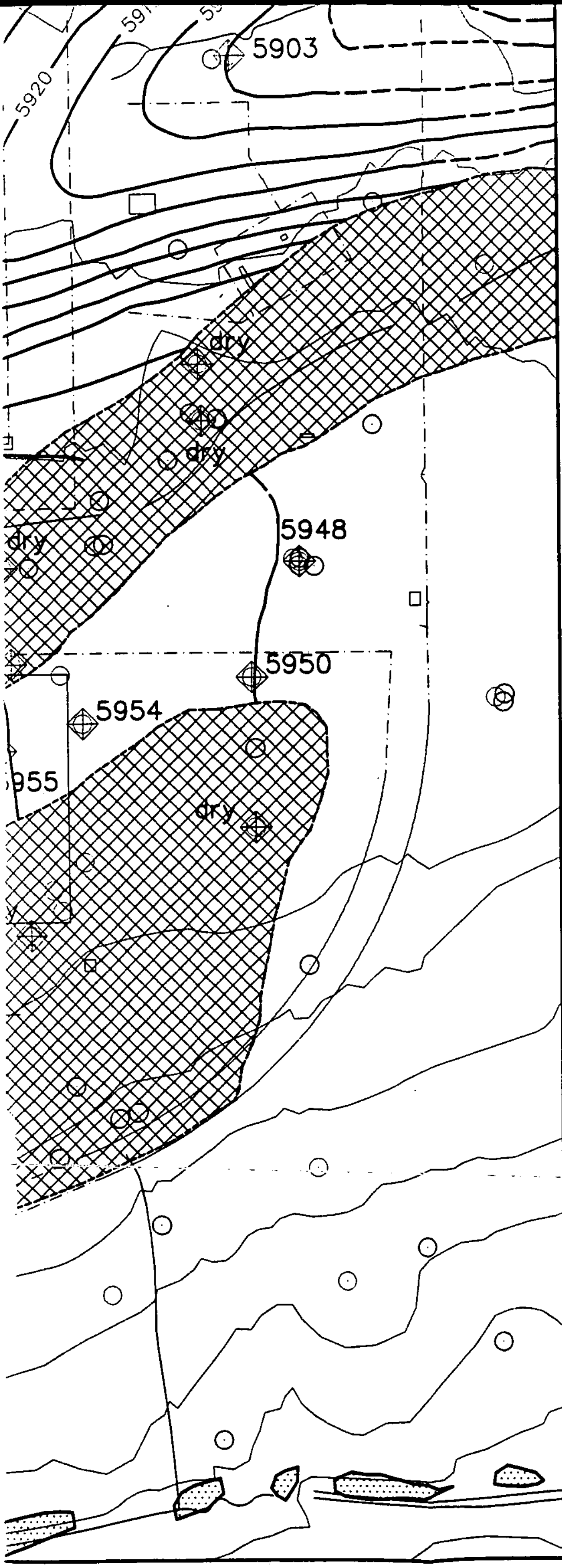
5960 Topographic Contour (Contour Interval 20 feet)

Building

Fence

Generalized direction of horizontal groundwater flow

Seeps/Wetlands



5960 Topographic Contour (Contour Interval 20 feet)

Building

Fence

Generalized direction of horizontal groundwater flow

Seeps/Wetlands

N

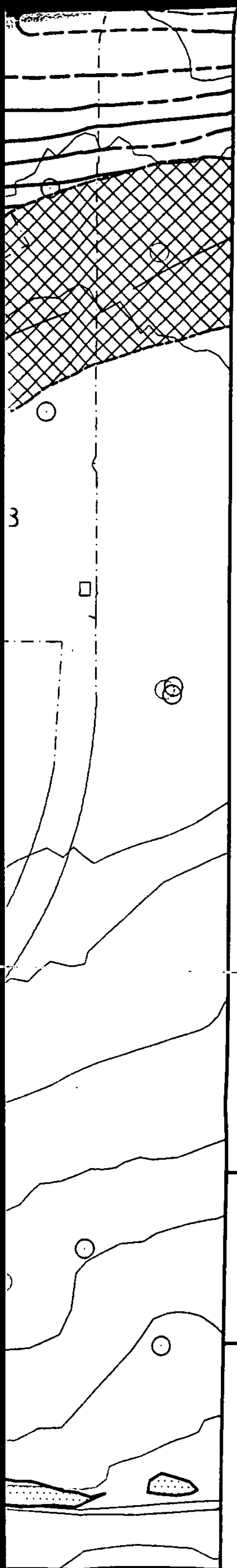
200 100 0 200 400 feet

U.S. Department of Energy

Rocky Flats Plant

EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464



5960 Topographic Contour (Contour Interval 20 feet)

Building

Fence

Generalized direction of horizontal groundwater flow

Seeps/Wetlands

N

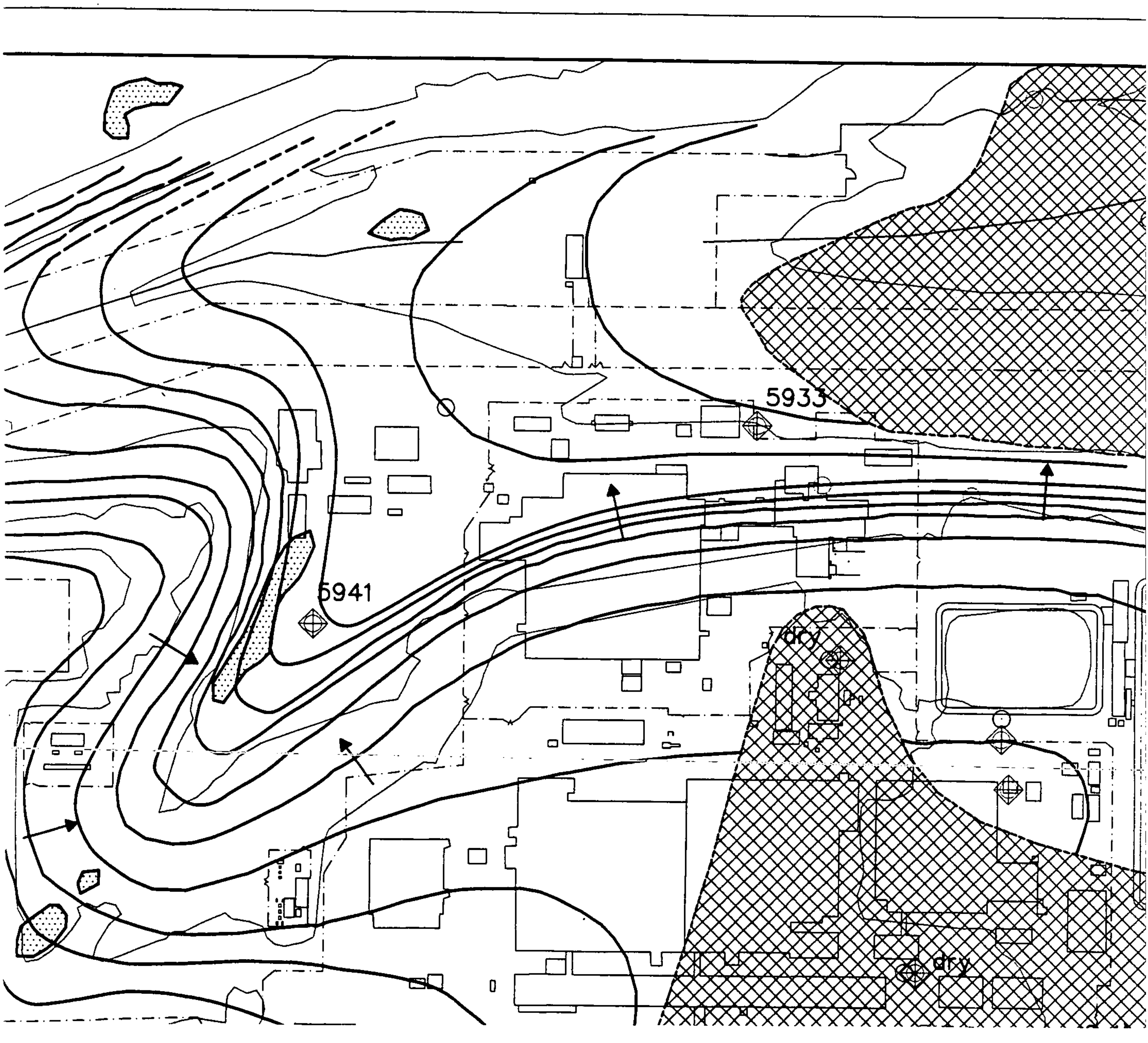
200 100 0 200 400 feet

U.S. Department of Energy

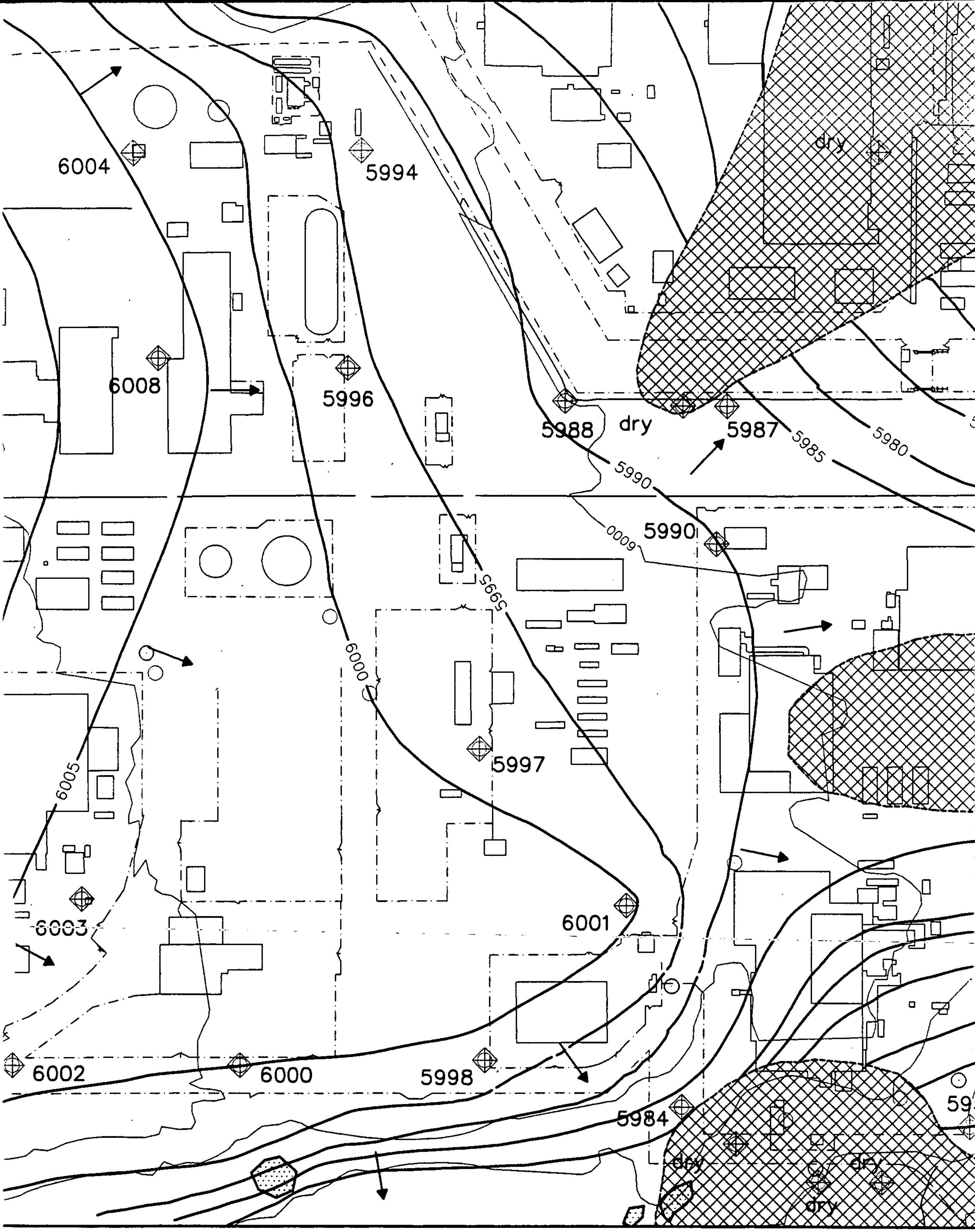
Rocky Flats Plant

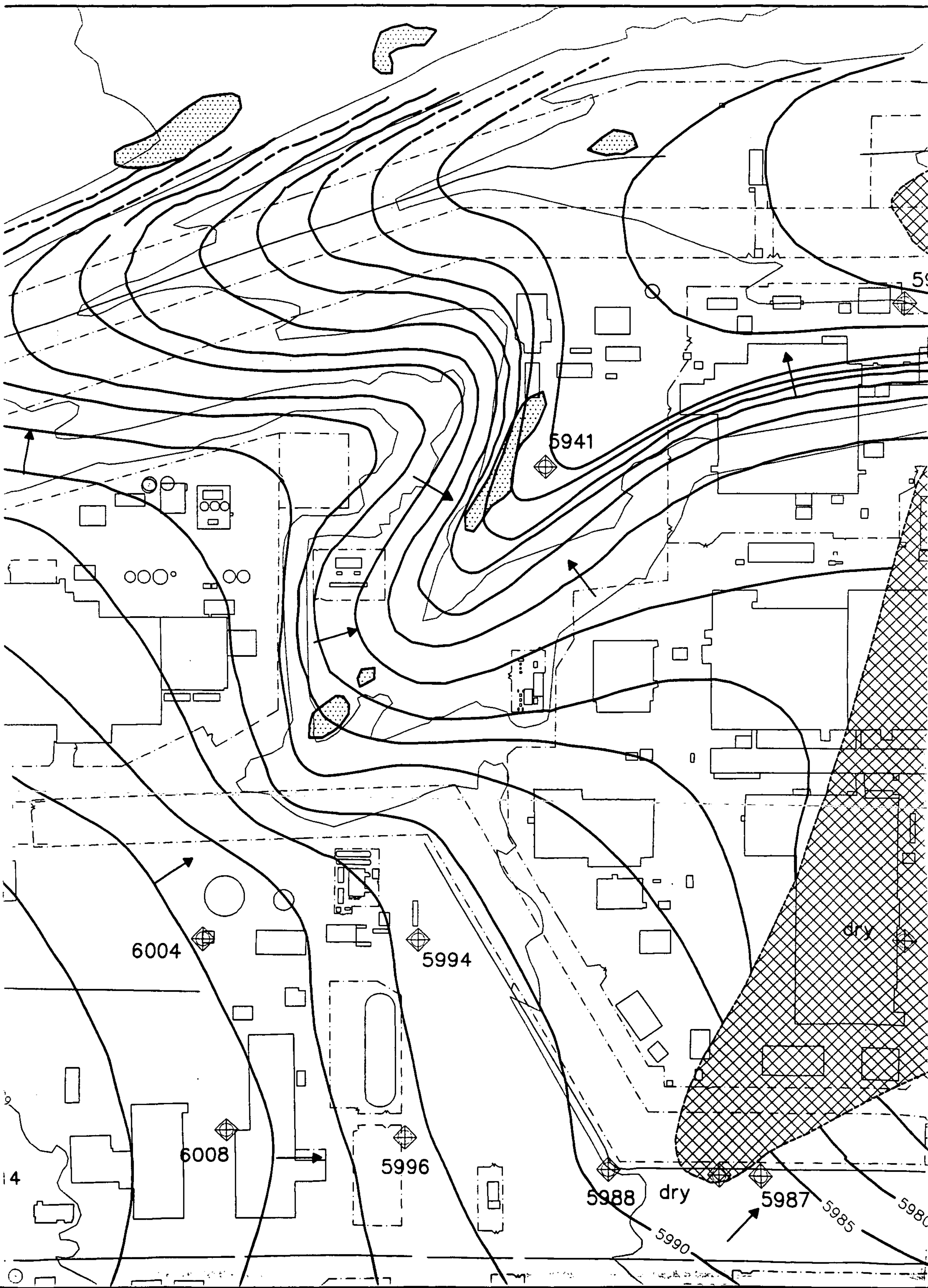
EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

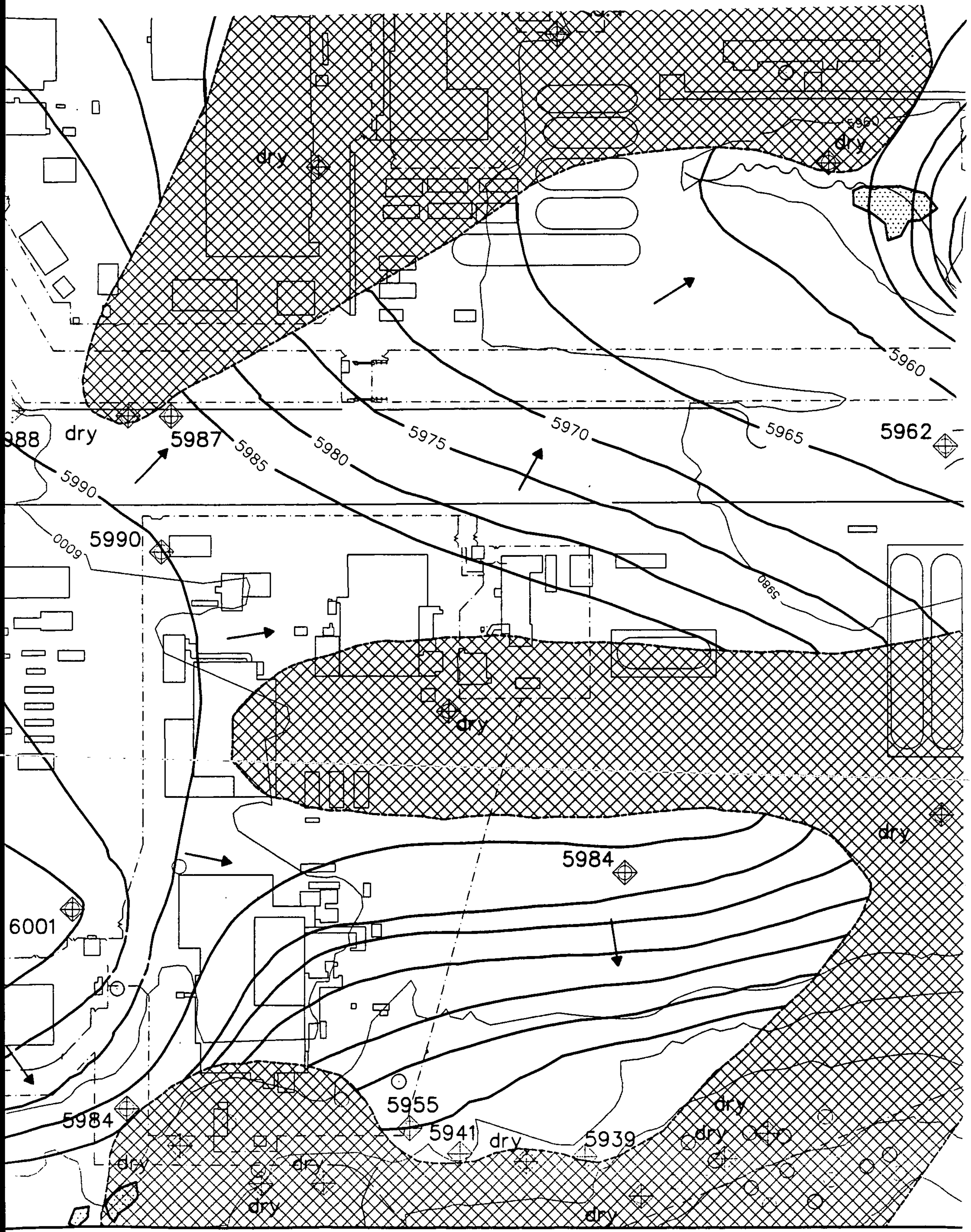


5933
5941
dry
dry

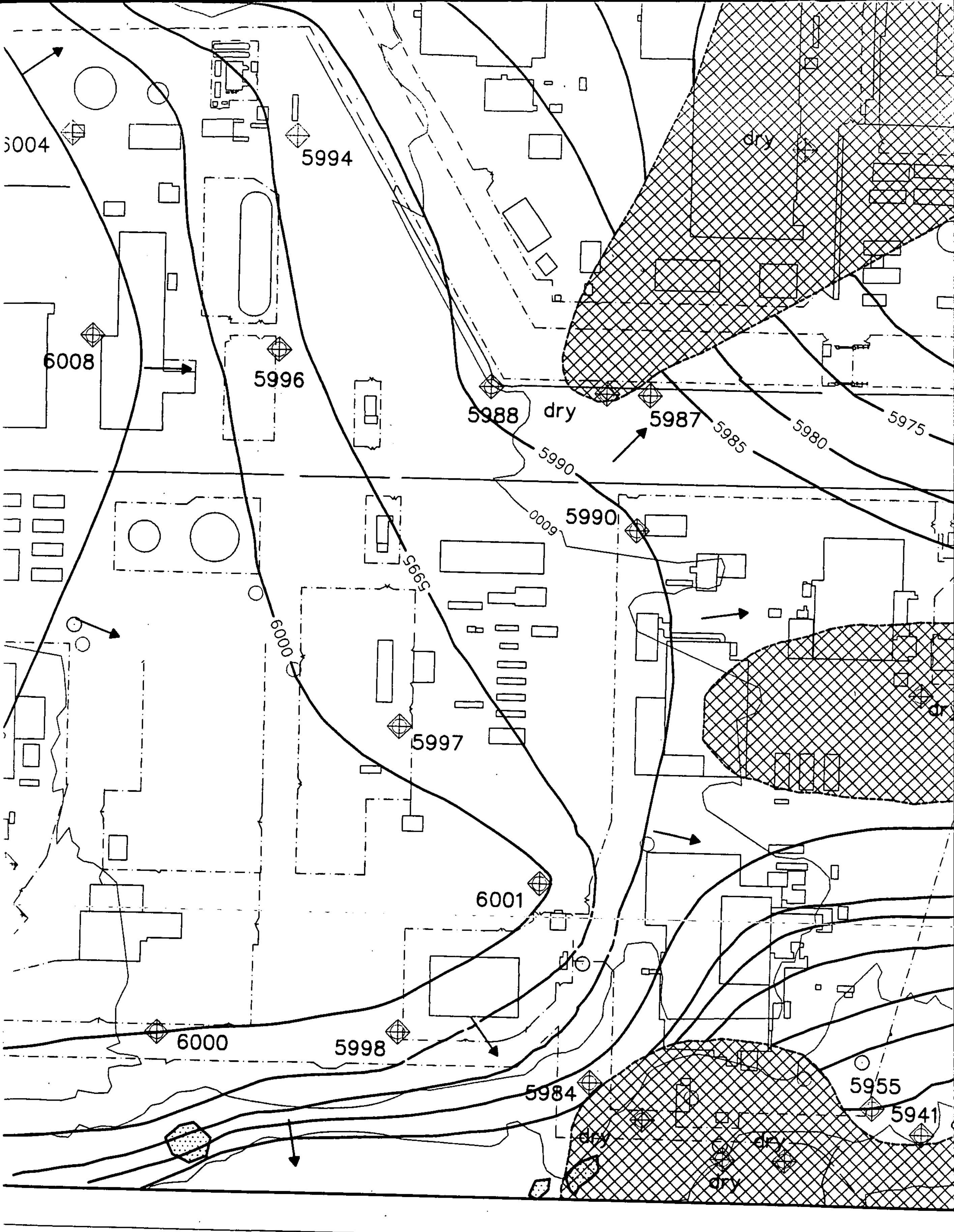

6004
5994
dry
6008
5996
5988
dry
5987
5985
5980
5990
6000
5990
5995
6000
6005
5997
6001
6003
6002
6000
5998
5984
dry
dry
dry



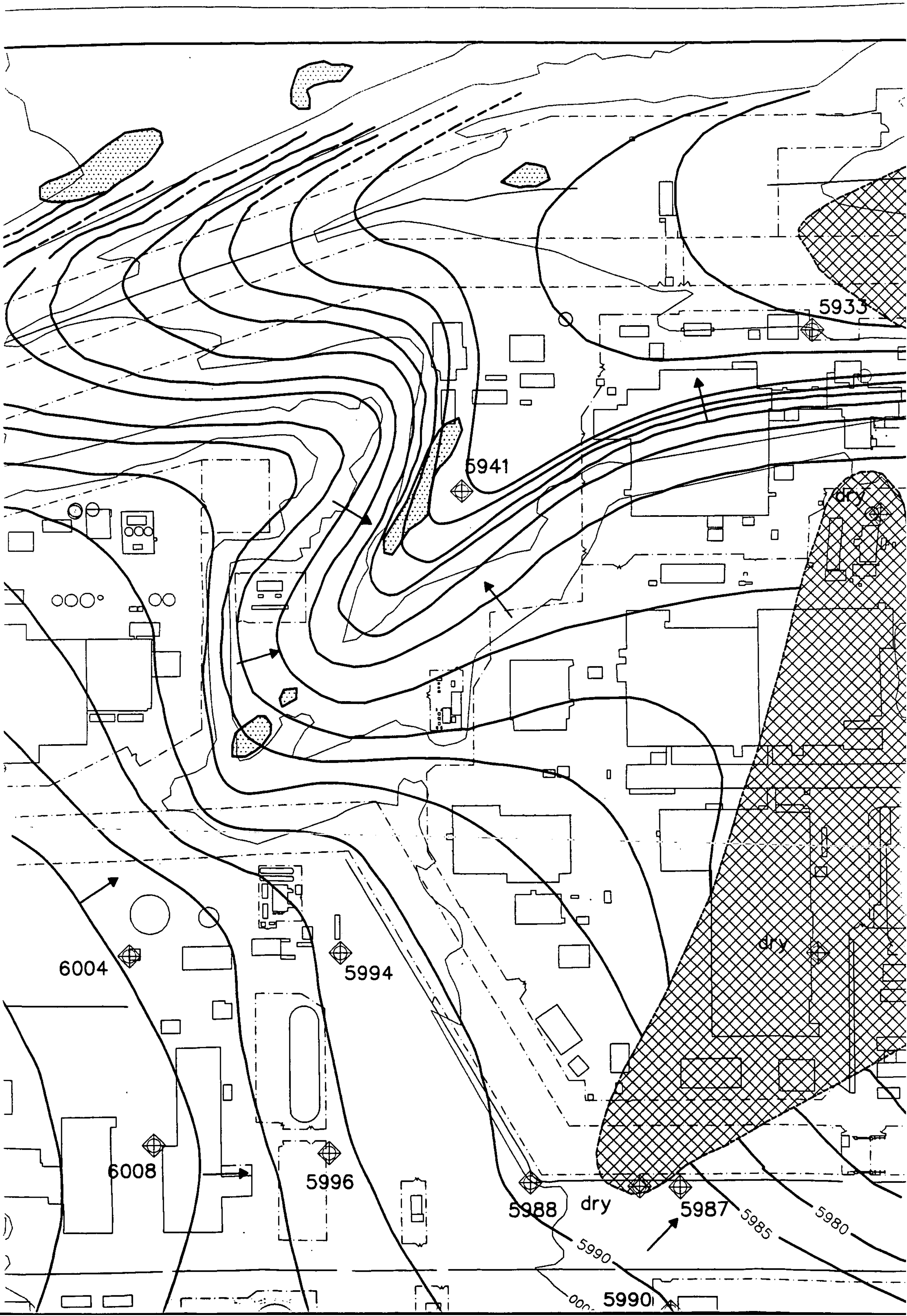
5941
6004
5994
6008
5996
5988
dry
5987
5990
5985
dry

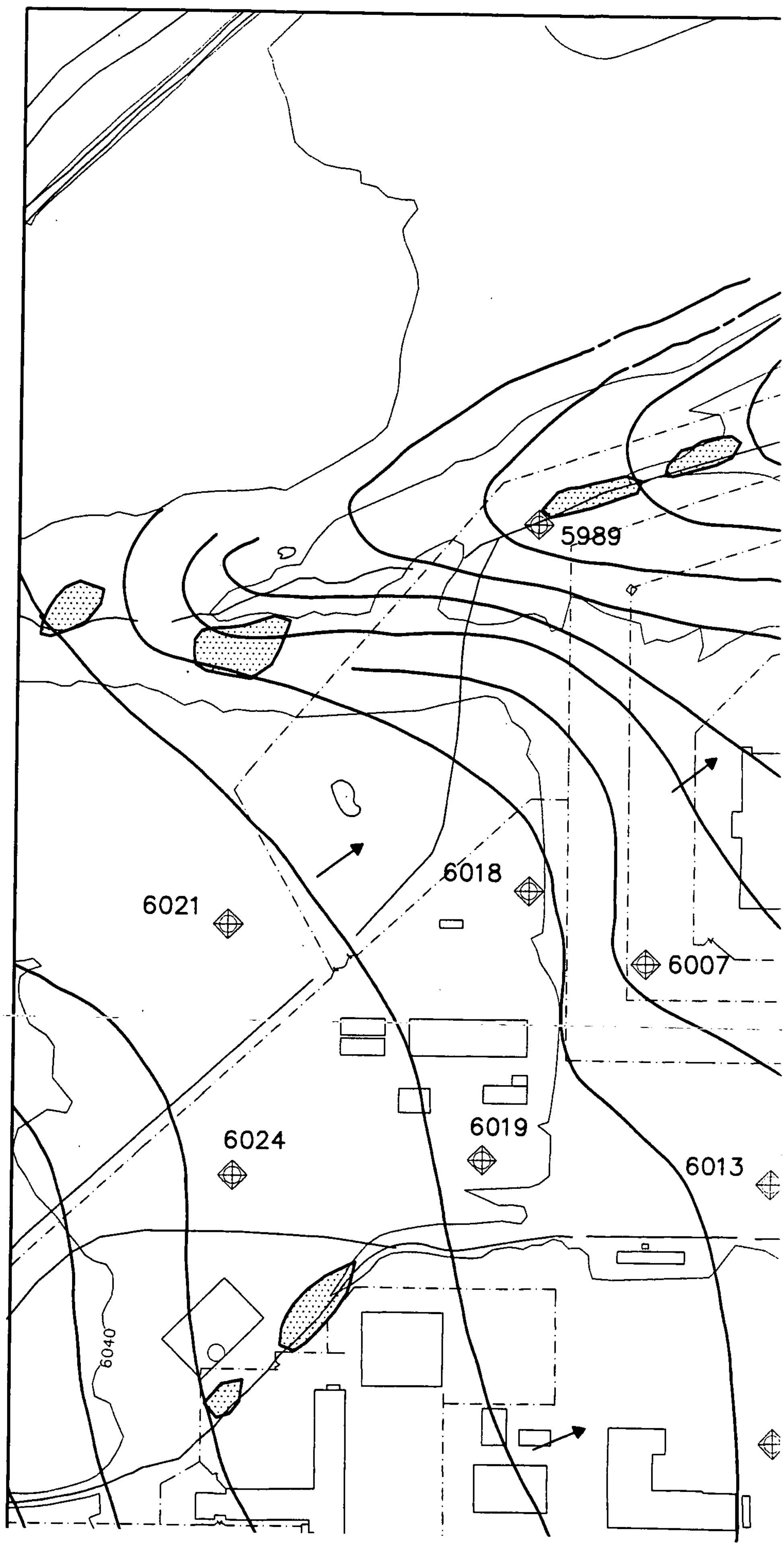


dry
5960
dry
5960
988
dry
5987
5985
5980
5975
5970
5965
5962
5990
5990
6000
5980
dry
dry
5984
6001
5984
5955
5941
dry
5939
dry
dry
dry
dry
dry
dry

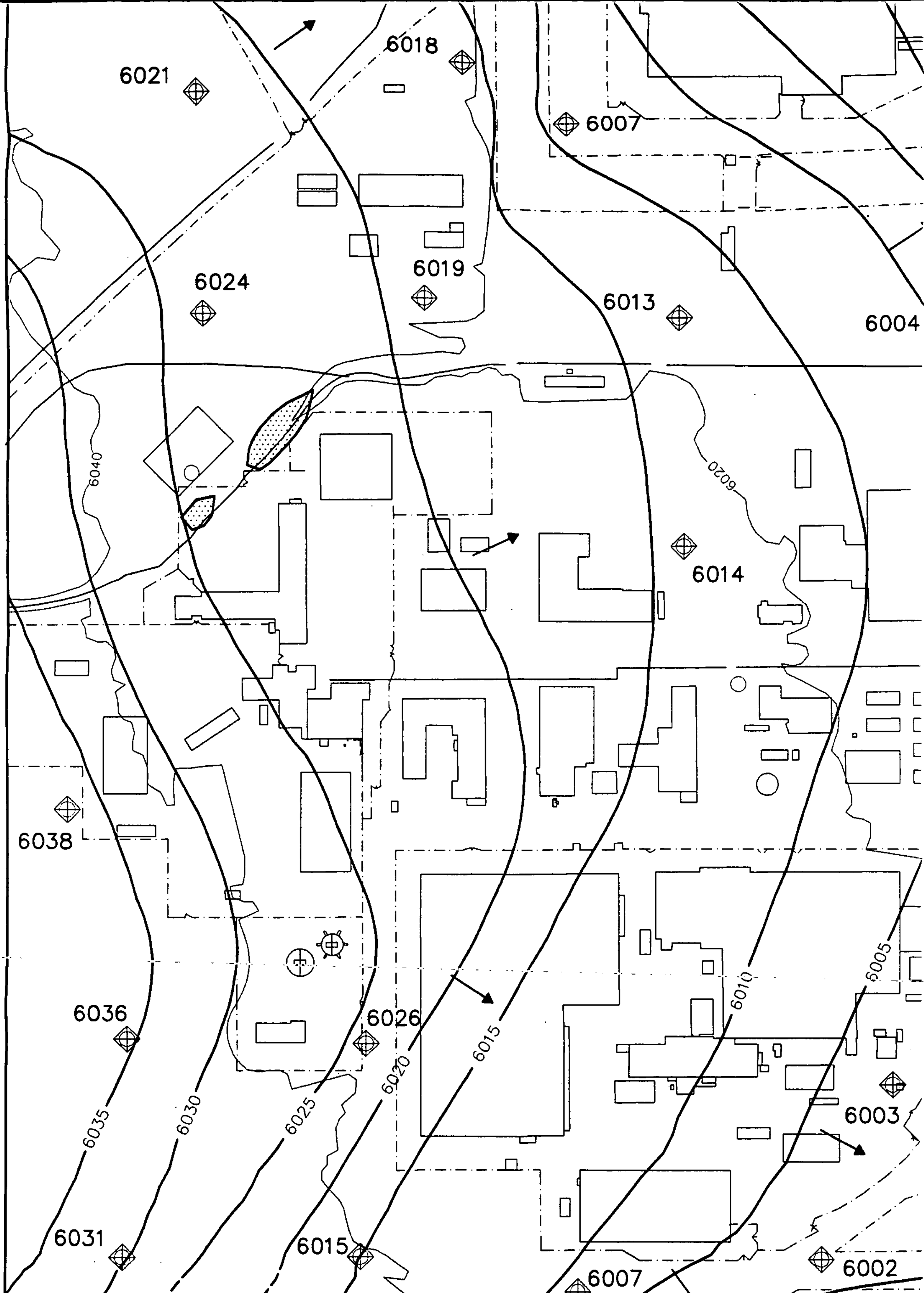


6004
5994
dry
6008
5996
5988
dry
5987
5985
5980
5975
5990
5990
6000
5995
6000
5997
6001
6000
5998
5984
5955
5941
dry
dry
dry

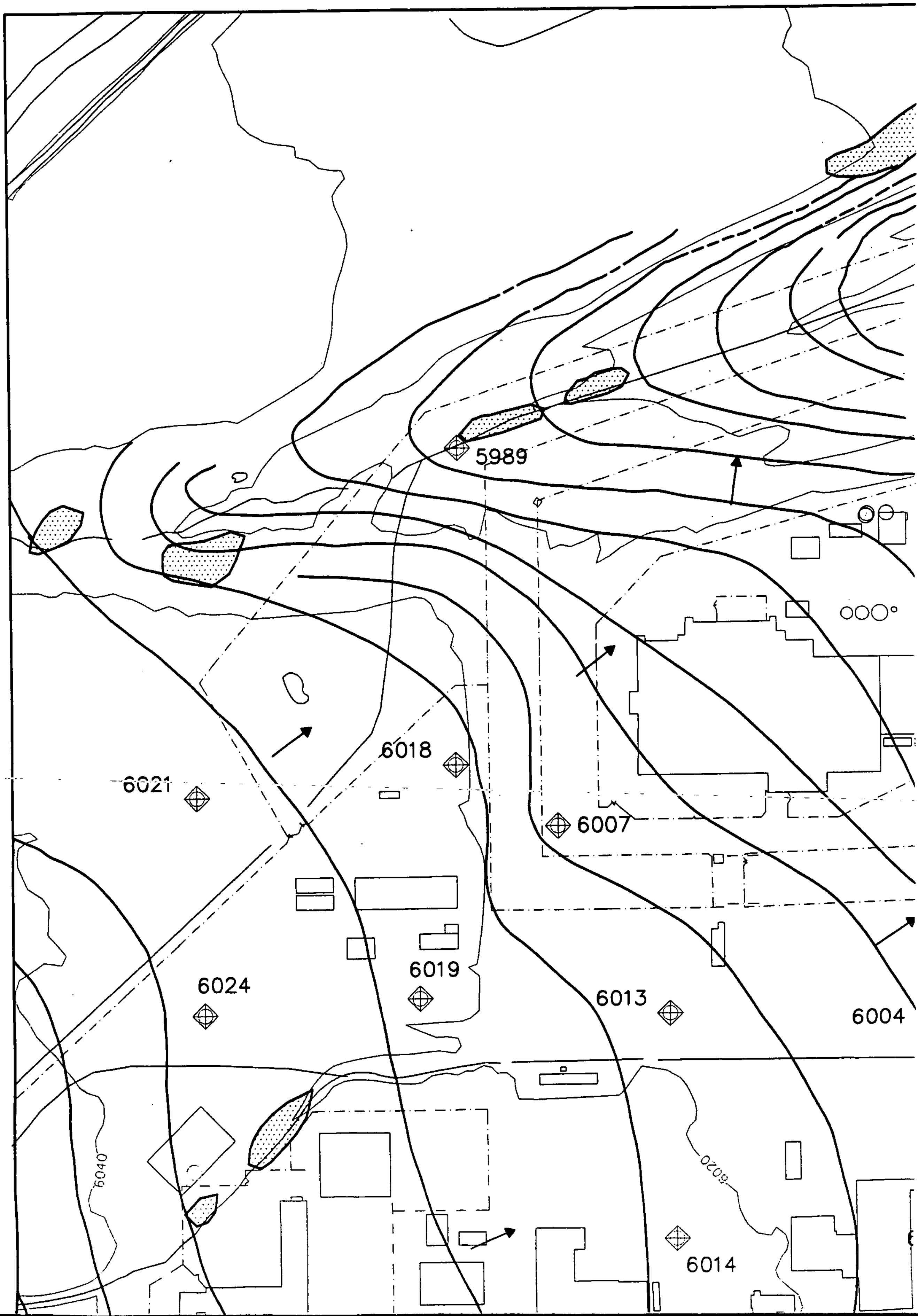

5933
5941
dry
6004
5994
dry
6008
5996
5988
dry
5987
5985
5980
5990
5990



5989
6021
6018
6007
6024
6019
6013
6040



c: \rflats\sw\swplt42.dwg 05H60300


5989
6018
6021
6007
6024
6019
6013
6004
6040
6020
6014

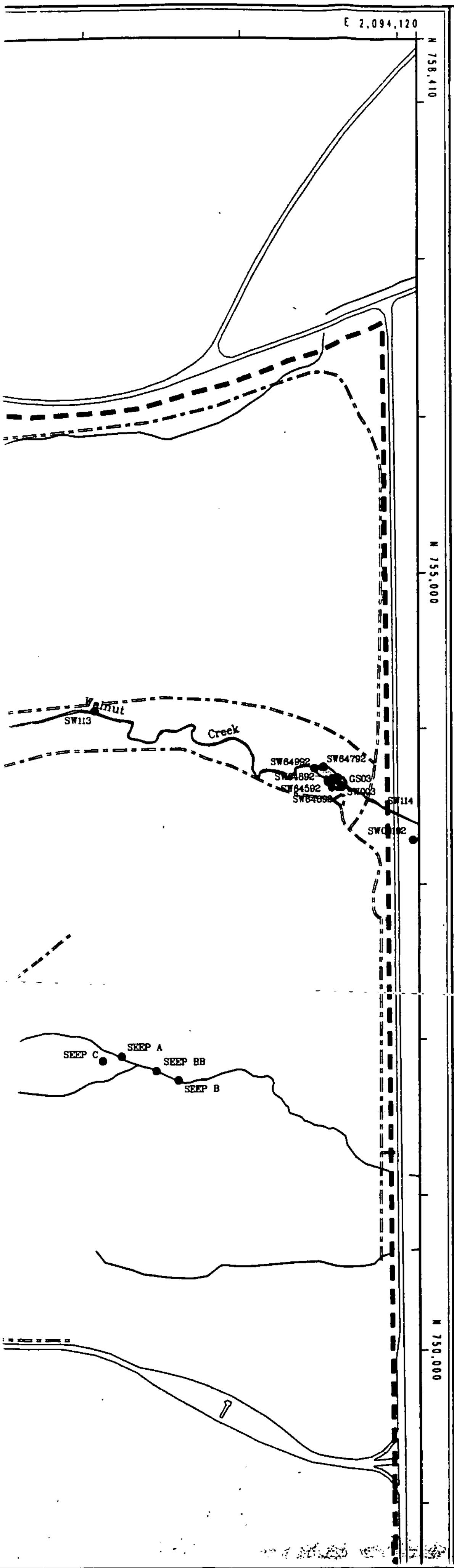


PLATE 5-1

Industrial Area IM/IRA/DD Surface Water Sampling Locations

EXPLANATION

- ● Surface water and sediment stations
- ● Routine operational sites
- ● NPDES/FFCA permit monitoring sites
- ○ Gaging stations
- ○ NPDES storm water permit sampling sites

Buildings or other structures

Lakes and ponds

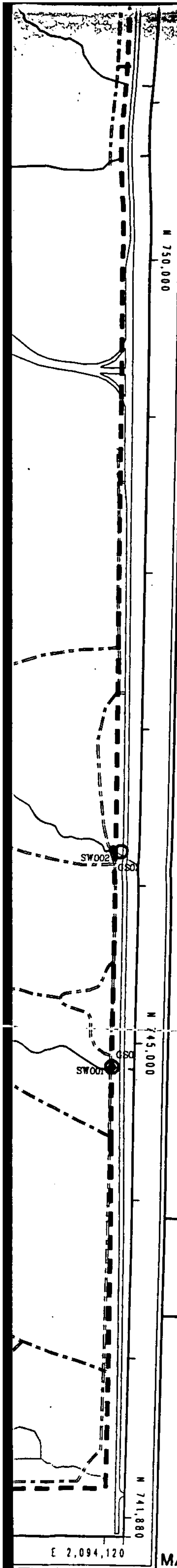
Streams, ditches, or other drainage features

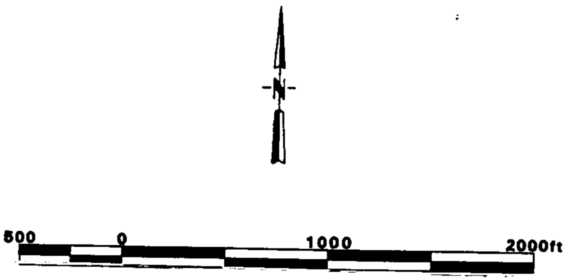
Fences

Rocky Flats boundary

Paved roads

Dirt roads





State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Plant

Prepared by:

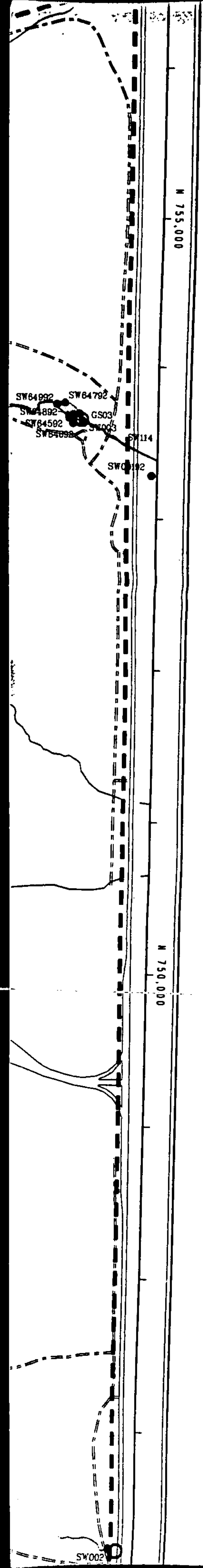
EG&G ROCKY FLATS

Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

MAP ID: SW

November 16, 1994

/home/s512660/projects/imira/surfwater2.aml



EXPLANATION

- ● Surface water and sediment stations
- ● Routine operational sites
- ● NPDES/FFCA permit monitoring sites
- O Gaging stations
- O NPDES storm water permit sampling sites

Buildings or other structures

Lakes and ponds

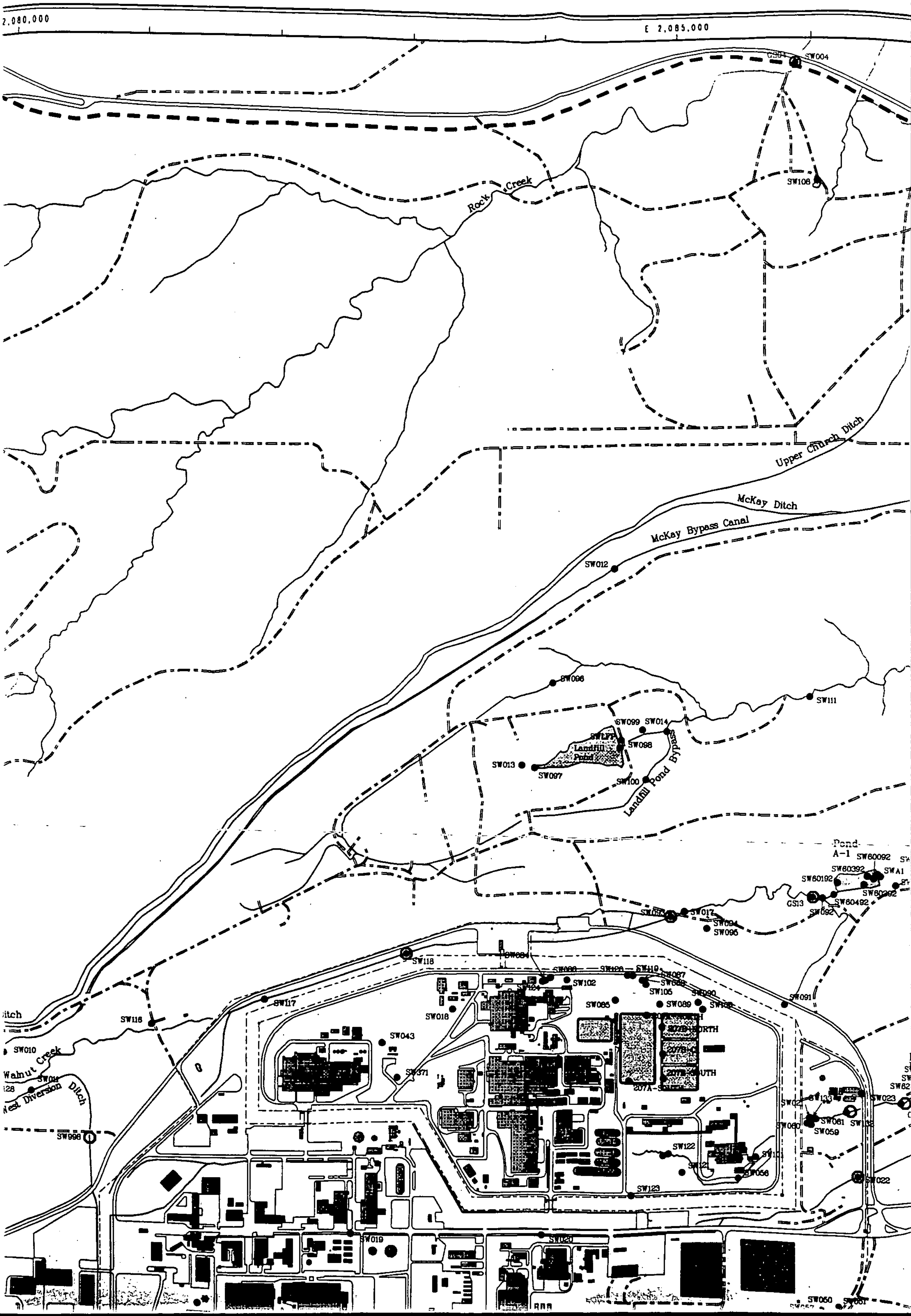
Streams, ditches, or other drainage features

Fences

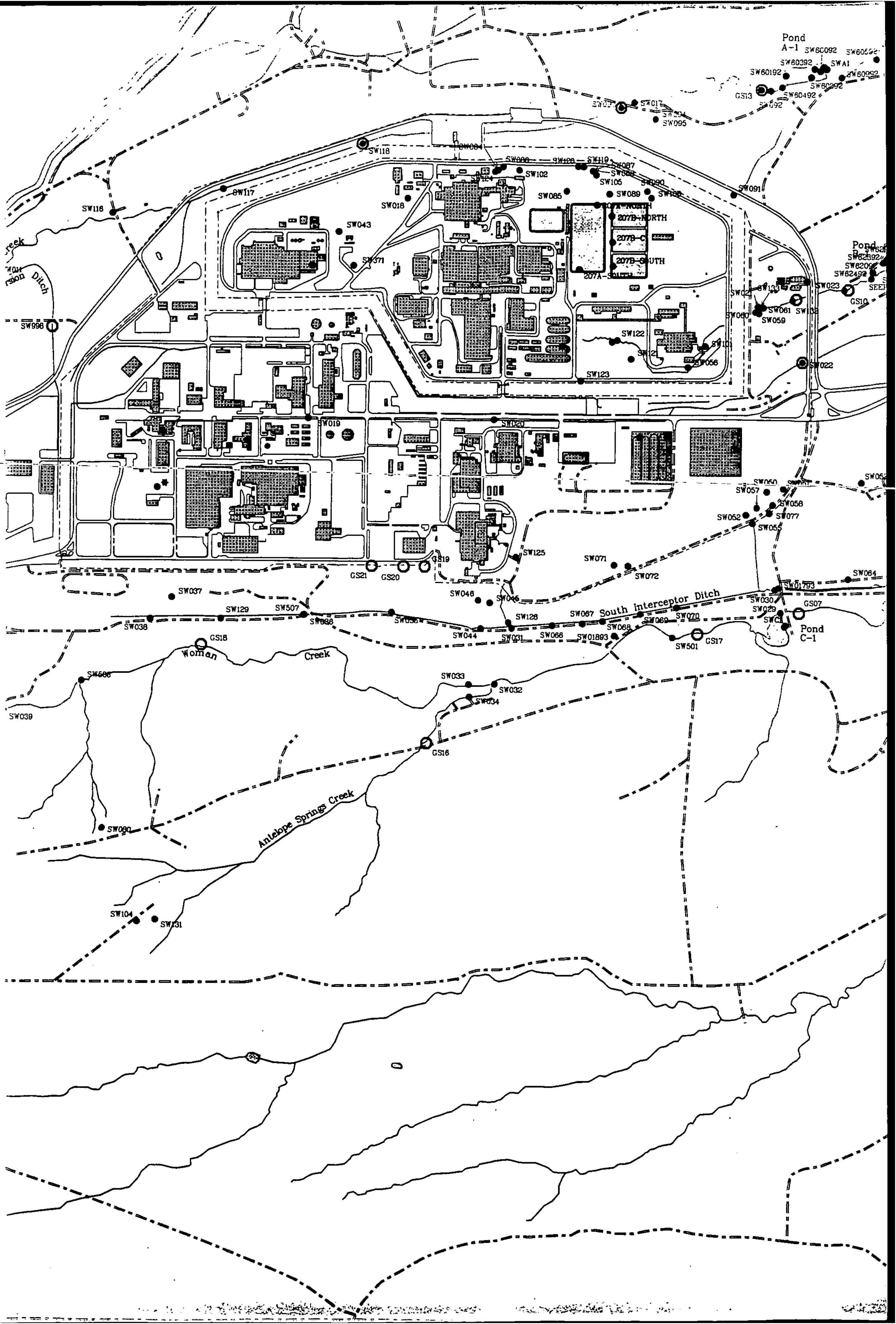
Rocky Flats boundary

Paved roads

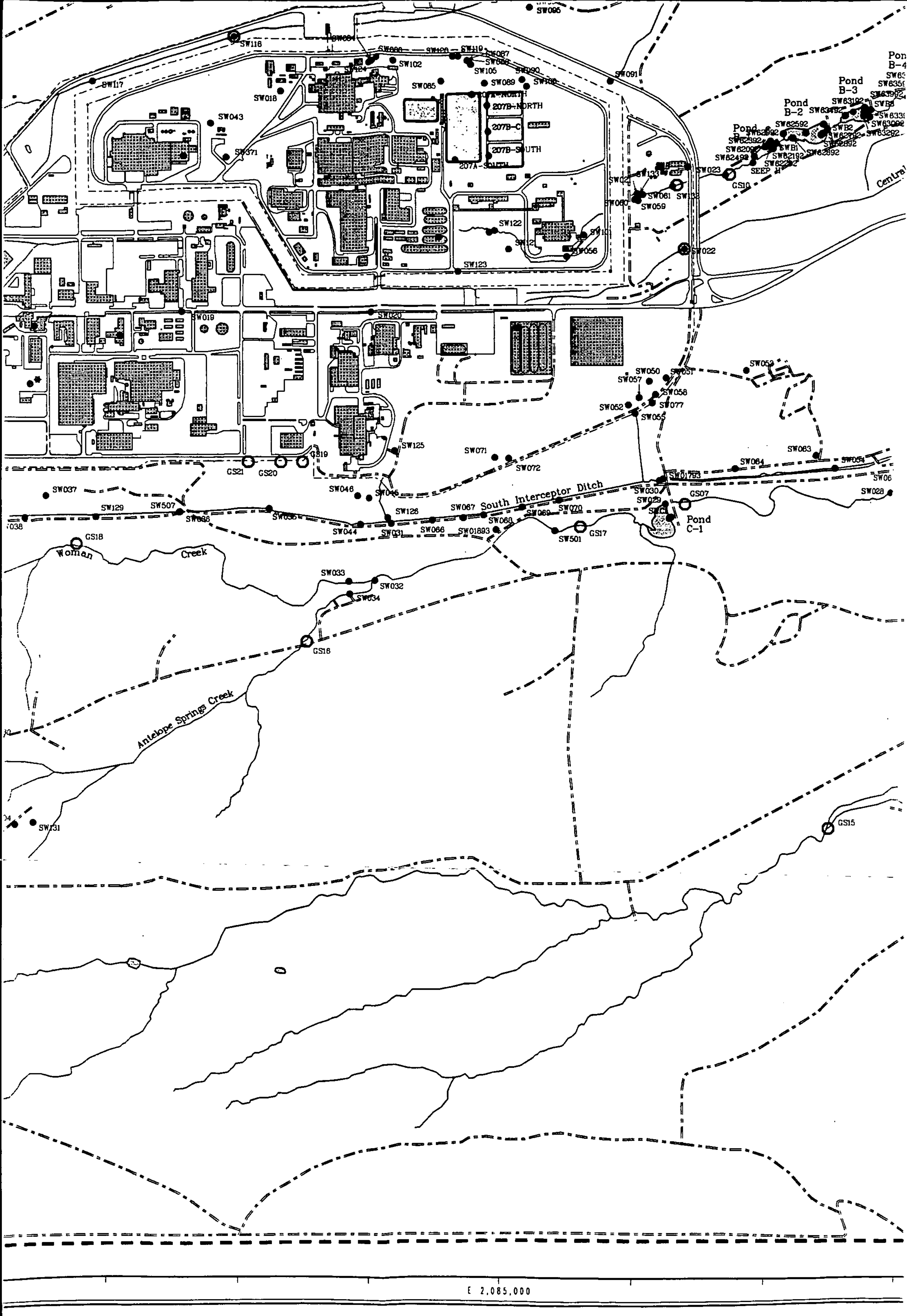
Dirt roads



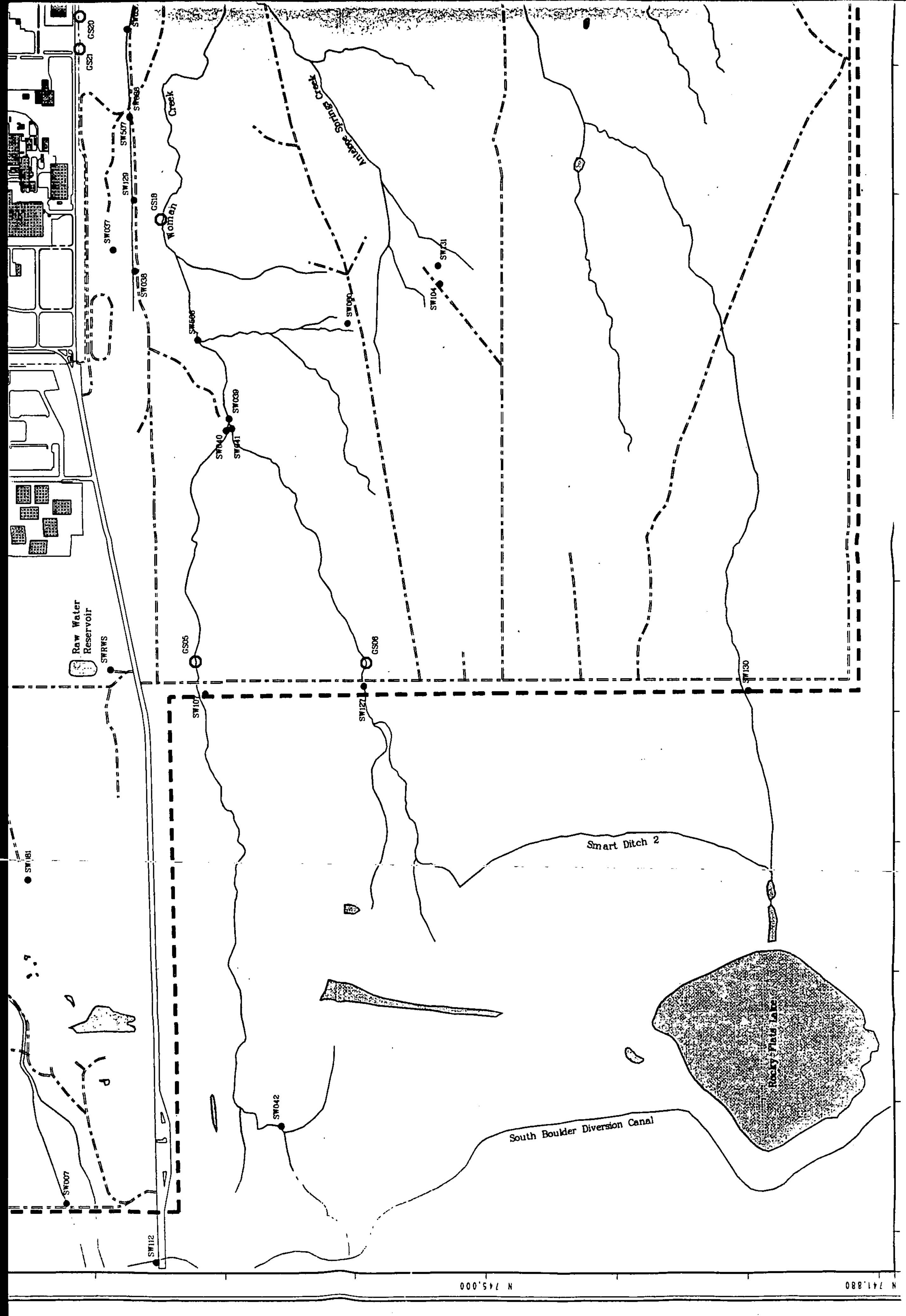
2,080,000
E 2,085,000
GS04
SW004
Rock Creek
SW106
Upper Church Ditch
McKay Ditch
McKay Bypass Canal
SW012
SW096
SW111
SW099
SW014
Landfill Pond
SW098
SW013
SW097
SW100
Landfill Pond Bypass
Pond A-1
SW60092
SW60392
SWA1
SW60192
GS13
SW60492
SW017
SW118
SW117
SW102
SW105
SW089
SW091
SW085
SW016
SW043
SW116
SW010
Walnut Creek
West Diversion Ditch
SW998
SW371
207B NORTH
207A-South
SW023
SW081
SW059
SW122
SW056
SW123
SW022
SW019
SW020
SW050



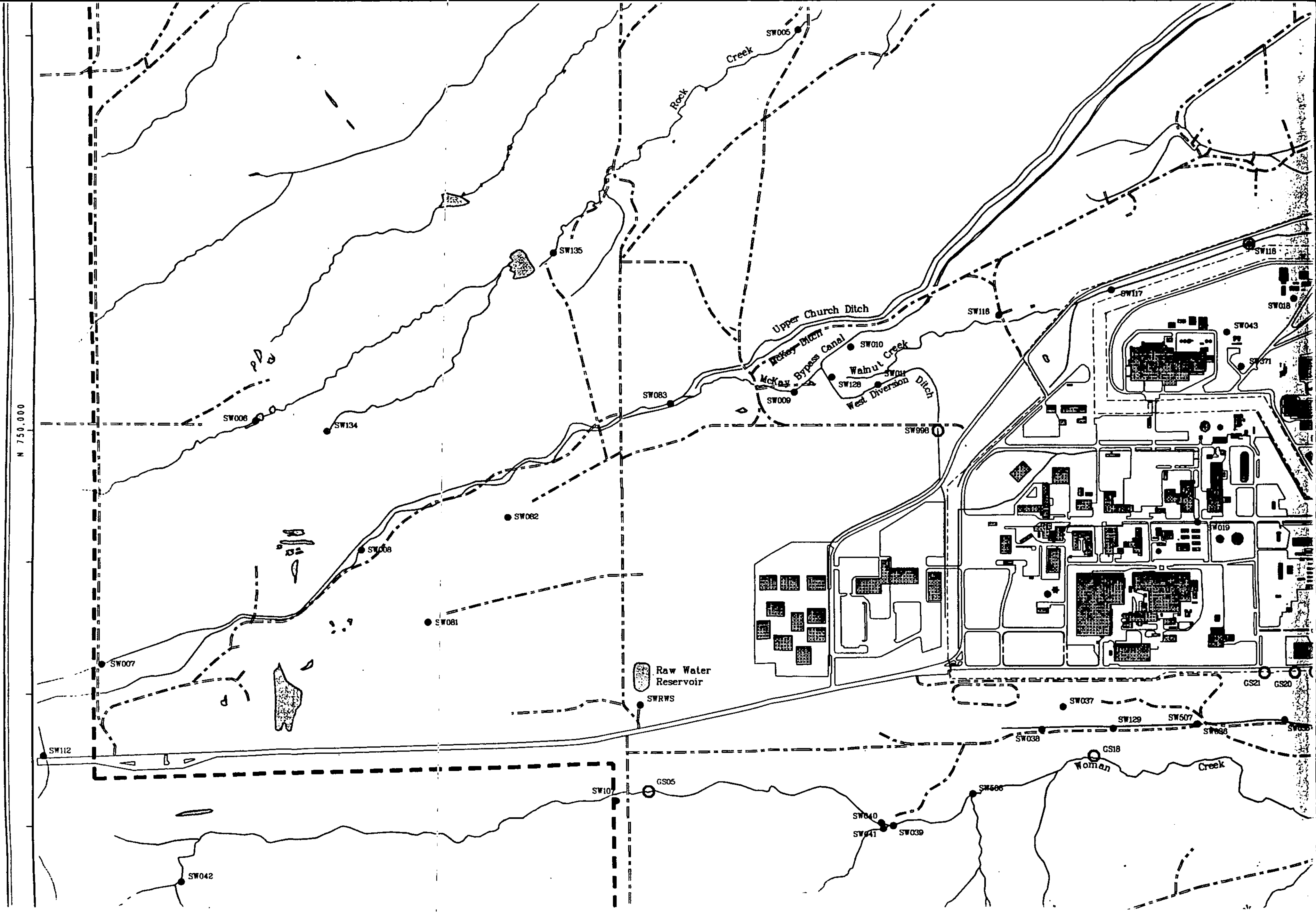
Pond
A-1
SW60092
SW60392
SWA1
SW60192
SW60992
SW60292
GS13
SW60492
SW017
SW095
SW118
SW084
SW088
SW119
SW087
SW102
SW105
SW090
SW085
SW089
SW117
SW018
SW091
SW116
SW043
207B-NORTH
207B-C
207B-SOUTH
SW371
Creek
Pond
SW023
GS10
SW061
SW059
SW122
SW101
SW056
SW996
SW123
SW022
SW019
SW020
SW050
SW057
SW058
SW052
SW077
SW055
SW125
SW071
SW072
GS21
GS20
GS19
SW064
SW037
SW046
SW01793
South Interceptor Ditch
SW129
SW507
SW030
GS07
SW038
SW128
SW067
SW070
SW029
SW044
SW031
SW066
SW01893
SW068
SW069
Pond
C-1
GS18
SW501
GS17
Woman
Creek
SW033
SW032
SW034
SW039
GS16
Antelope Springs Creek
SW080
SW104
SW131

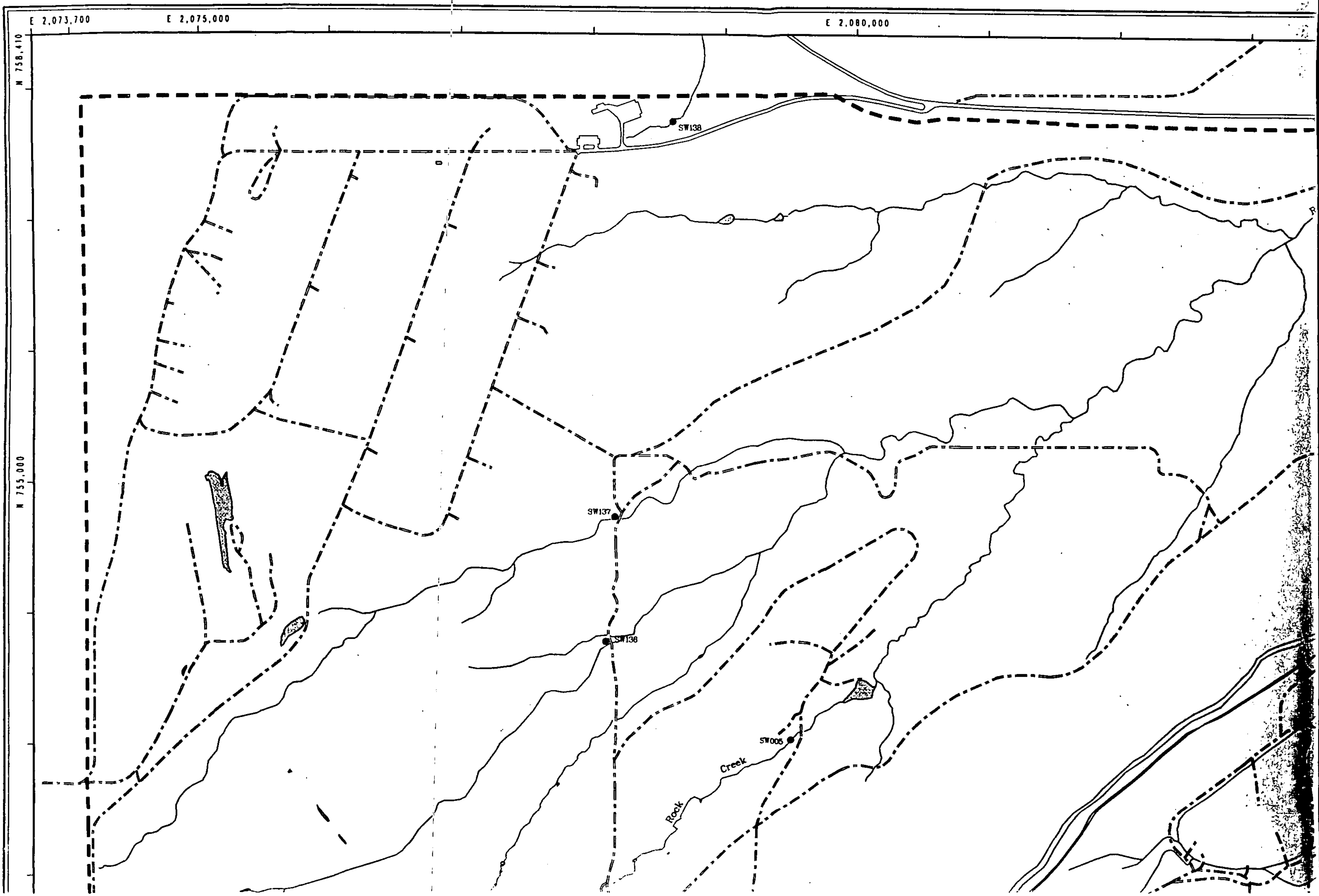


SW096
SW116
SW084
SW086
SW120
SW119
SW087
SW088
SW102
SW105
SW090
SW091
SW117
SW018
SW085
SW089
SW043
207A-NORTH
207B-NORTH
207B-C
207B-SOUTH
207A-SOUTH
SW371
Pond B-4
Pond B-3
Pond B-2
Pond B-1
SW63192
SW63492
SW62592
SWB3
SWB2
SWB1
SW62092
SW82492
SW82192
SW82292
SW63892
SEEP H
SW023
GS10
Central
SW061
SW060
SW059
SW122
SW056
SW022
SW123
SW019
SW020
SW050
SW051
SW053
SW057
SW058
SW052
SW077
SW055
SW125
SW071
SW072
SW063
SW064
SW054
SW01793
SW028
GS21
GS20
GS19
SW037
SW046
SW045
SW030
SW029
GS07
SW129
SW507
SW126
SW067
South Interceptor Ditch
SW070
Pond C-1
SW036
SW044
SW031
SW066
SW01893
SW069
SW068
SW501
GS17
GS18
Woman Creek
SW033
SW032
SW034
GS16
Antelope Springs Creek
SW131
GS15
E 2,085,000



GS20
GS21
SW507
SW129
SW037
SW038
GS18
Woman Creek
Antelope Springs Creek
SW039
SW040
SW041
SW090
SW131
SW104
Raw Water Reservoir
SWRWS
GS05
GS06
SW107
SW127
SW130
SW081
Smart Ditch 2
Rocky Flats Lake
SW042
South Boulder Diversion Canal
SW007
SW112
N 745,000
N 741,880


N 750,000
SW005
Rock Creek
SW135
SW006
SW134
SW083
Upper Church Ditch
McKay Ditch
McKay Bypass Canal
SW010
Walnut Creek
SW128
SW009
West Diversion Ditch
SW998
SW116
SW117
SW118
SW018
SW043
SW371
SW019
SW082
SW008
SW081
SW007
Raw Water Reservoir
SWRWS
SW112
GS21
GS20
SW037
SW129
SW507
SW038
GS18
Woman Creek
GS05
SW566
SW040
SW041
SW039
SW042



E 2,073,700
E 2,075,000
E 2,080,000
N 758,410
N 755,000
SW138
SW137
SW136
SW005
Rock Creek